June 25, 1945

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

TECHNOLOGY DEPT.

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JUN 25 1945

Birth of a Kaiser Ship

ARMY ★ NAVY

5 plants of Blaw-Knox Company have been awarded the Army-Navy "E" for excellence

Production records of the Kaiser enterprises on the Pacific Coast have amazed industrial America... Pictured here is the Lewis 42 in. x 112 in. Three-High Finishing Mill, *part of the complete mill designed and erected by Lewis in the remarkable time of fourteen months*—engaged in turning out the vast tonnage of plate required for the great fleet of Kaiser-built ships.

***Also Manufacturers of* LEWIS ROLLS**
for the iron, steel and non-ferrous industries

LEWIS FOUNDRY AND MACHINE

DIVISION OF BLAW-KNOX COMPANY . . . PITTSBURGH, PA.

Leveller in foreground; welder in action behind.

Former and welder (left) powered by two Type T Heavy-duty Reliance Splash-proof Motors.

• Feeding steel plates through a leveller, then into a welder, next to a former and finally into a pipe straightener is a rough, tough job—yet one which requires fine synchronization and hairline control.

It is being done successfully and profitably by means of Reliance Motor-Drive—a combination of all-electric controls which takes care of each operation in sequence and turns out a highly satisfactory finished product.

It will pay you to investigate the possibilities of handling operations of this kind electrically—the Reliance way. An application engineer will be glad to show you detailed information on the ways in which steel men are making use of Reliance V★S Drive.

RELIANCE ELECTRIC & ENGINEERING CO.

1081 Ivanhoe Road • Cleveland 10, Ohio

Birmingham • Boston • Buffalo • Chicago • Cincinnati • Detroit • Greenville (S. C.) • Houston • Kalamazoo • Los Angeles • Minneapolis
New York • Philadelphia • Pittsburgh • Portland (Ore.) • St. Louis • San Francisco • Syracuse • Washington, D. C. • and other principal cities

RELIANCE A·C D·C MOTORS

"Motor-Drive is More Than Power"

HOW CHANGE OF METHODS CUT ANNEALING TIME 65%

BETHLEHEM "TROUBLE SHOOTER" BREAKS BOTTLENECK IN MIDWESTERN PLANT

OPERATION: Production of alloy-steel armor-piercing shot forgings, in a large plant in the Midwest.

PROBLEM: To cut production time. Quality of forgings was high, but difficulties in annealing had necessitated a slow process that drastically reduced the quantity of material turned out.

SOLUTION: The matter was referred to our home office by the producer of these forgings. A Bethlehem metallurgist went immediately to the plant in question, studied every phase of the annealing problem. After sifting the facts, he installed a system of isothermal annealing, by means of which a uniform lamellar structure was maintained.

RESULTS: Hardness comparable to that of lamellar perlite; *a time saving of more than 65 per cent* over the conventional method of slow furnace cooling.

A chip from the nose-forming tool. "Papier mâché" effect indicates good machining properties.

To Bethlehem "trouble shooters," cases like this one are an almost daily diet. Our metallurgists do not claim to be magicians, but their years of practical experience have fitted them well to solve problems brought on by wartime. Perhaps they can help *you* work faster and more efficiently with steels.

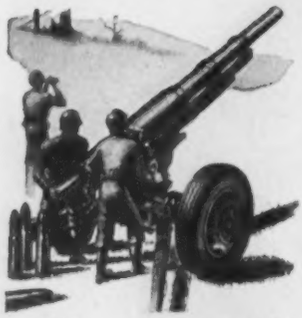
If you have a question regarding analyses, properties, heat-treating, or applications, always feel free to consult with Bethlehem technicians —on either present or postwar problems.

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.
BETHLEHEM STEEL EXPORT CORPORATION, New York

★ BETHLEHEM STEEL ★

HERE'S HOW Broaching by *American* helps

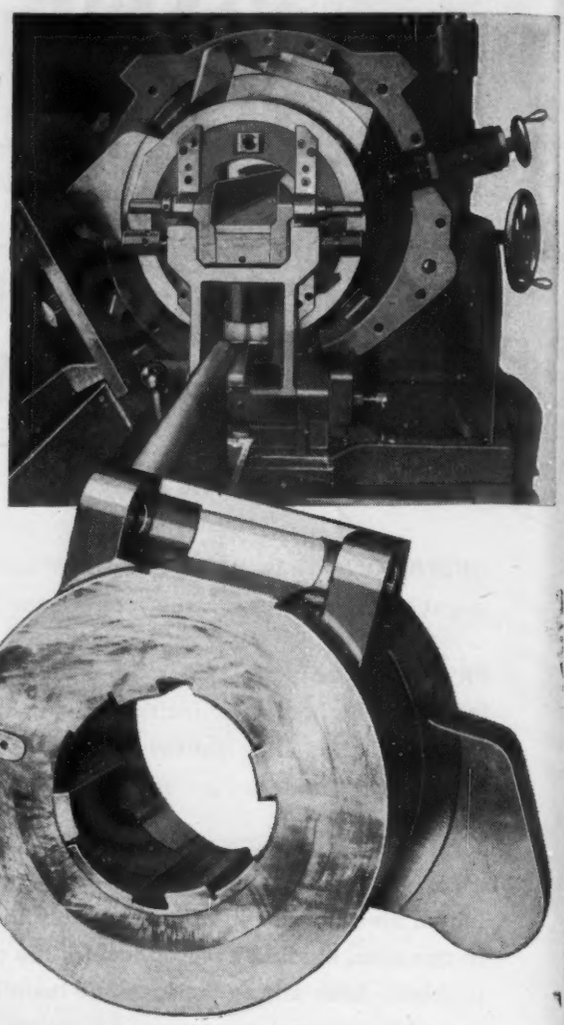
"KEEP UP THE BARRAGE"

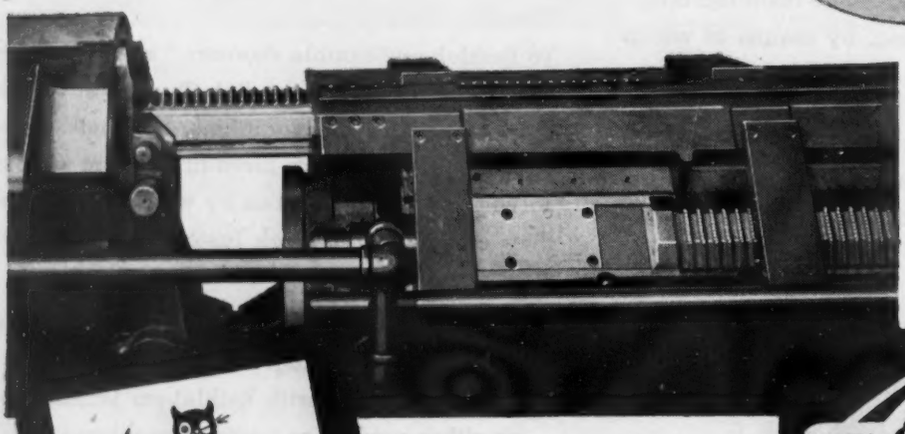


Speed — speed in production — is a prime factor in the manufacture of big guns to keep our far-flung battlefronts ablaze. "More guns in a hurry" has been a constant demand from all parts of the world.

A high rate of production—plus fine finish and absolute accuracy—has been attained by *American* engineers in designing equipment for broaching lock step slots in 8″ howitzer breech rings. The setup makes use of two *American* H-60-72 horizontal broaching machines and eleven different broaches to accomplish this task.

Whether your production requires fast output, excellent finish, or accuracy to close tolerances, whether it involves the use of standard or special machinery, let *American* engineers recommend the correct broaching equipment to do the job. *American's* complete broaching service—machines, tools, and engineering—is at your disposal. Write for details today.





Slots in breech rings for 8″ howitzers are broached on two *American* H-60-72 broaching machines, identical except for various broaches required for this operation. Top photo shows fixture which indexes the part one-quarter turn after each cut. Lower photo is of the finished part.

Above: American H-60-72 broaching machine, used in broaching lock step slots in 8″ howitzer breech rings. Turret holds five broaches and revolves after each four cuts to bring next broach in position for cutting. A similar set-up with six-broach revolving turret is used for completing the part.

MEMBER BROACHING TOOL INSTITUTE

American

BROACH AND MACHINE CO.

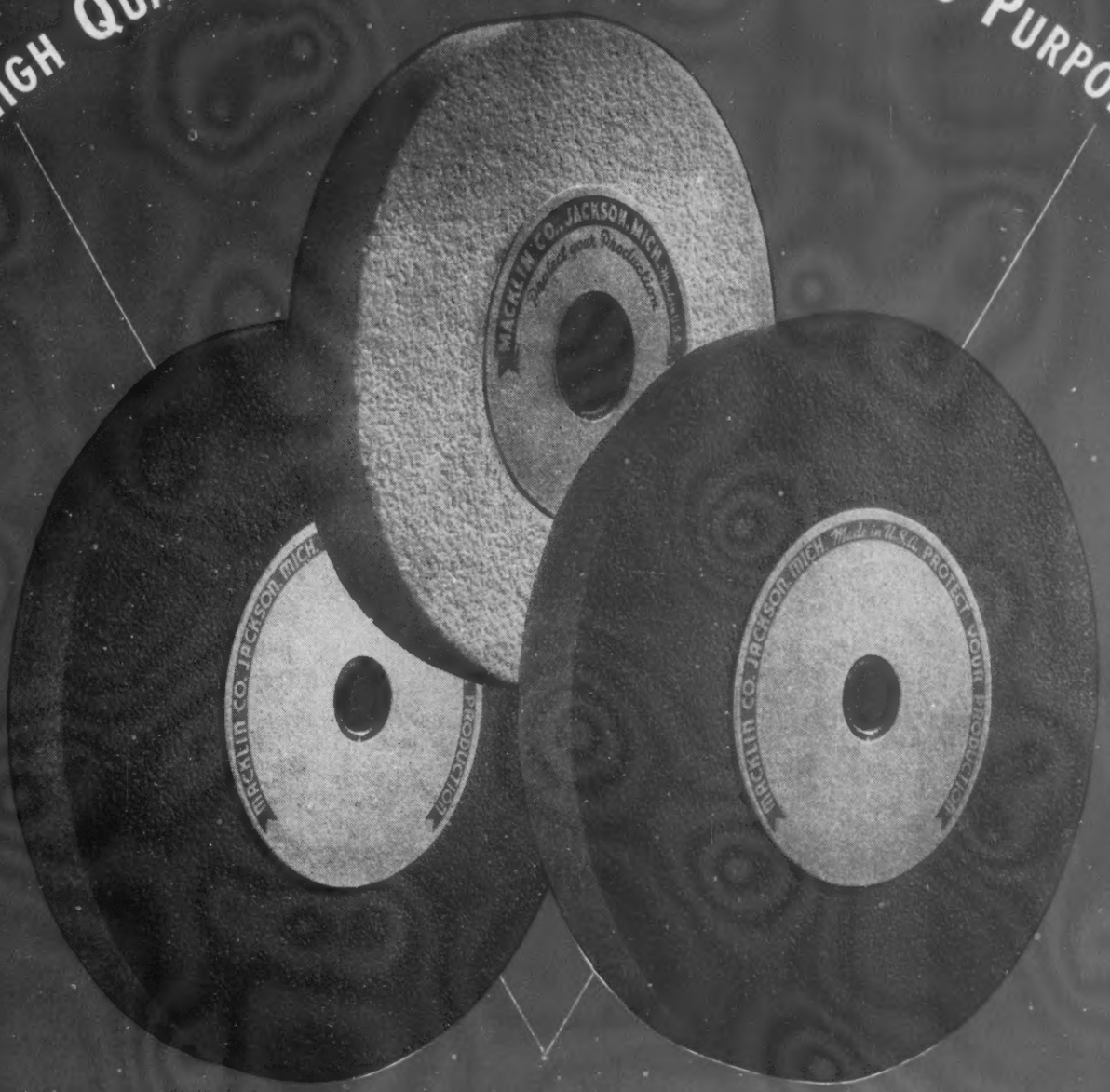
ANN ARBOR, MICHIGAN

•

BROACHING MACHINES
PRESSES
BROACHING TOOLS
SPECIAL MACHINERY

DIVISION OF SUNDSTRAND MACHINE TOOL CO.

HIGH QUALITY WHEELS FOR EVERY GRINDING PURPOSE



"PROTECT YOUR PRODUCTION"

MACKLIN COMPANY

Manufacturers of GRINDING WHEELS — JACKSON, MICHIGAN, U. S. A.

Distributors in all principal cities

Sales Offices: — Chicago · New York · Detroit · Pittsburgh · Cleveland · Cincinnati · Milwaukee · Philadelphia

BEHIND THE SCENES

More Squawks

■ Charles D. Townsend, process engineer of Cleveland, says that the term "squawk level" may be a new one to us, but that it is much used and accepted particularly in the aircraft industry.

According to Mr. T. "squawk" is used to indicate the complaints made by the Inspection Department in regard to the ship assembly. Generally a "squawk sheet" is written up by the inspectors and each "squawk" must be worked off and signed by the foreman as being satisfactory before the next inspection takes place. It is in this manner that the assembly crews as well as the management are kept constantly aware of those small items that are continually neglected by the workers.

Wrong Again

■ Speaking of squawks, we received an embarrassing one from the editors last week for not knowing our own family tree, nor the origin of our own name. We blithely explained that SHRDLU comes from the first row of linotype keys, but as we should have known, if we had only stopped to think, our younger brother ETAOIN lives there and we hang out in the second row.

Average Man

■ This is an outright steal from *The Postage Stamp* but we chuckled over it and maybe you will too.

"The most interesting person in the world is the average man. The average man is 39 around the chest, 40 around the waist, 96 around the golf course and a nuisance around the home.

"He gets up first in the morning, is second at the morning newspaper, third in the bathroom and practically misses the bus to town. He wears a conventional gray or brown suit with a white shirt but always thought he'd be at his best in a checkered suit with a dark flannel shirt and a bright red tie. He passes up the French-fried potatoes and the hot rolls at lunch and then eats mince pie to bridge the gap.

"He can hit two quail out of five tries, catches an occasional fish, plays poker once a month, opens with a large pair, bluffs when he is winner and doesn't like conversation when he is loser. He complains about taxes, shortages of labor, rationing and politics. He has a favorite football team but will take the other team and fourteen points. He drinks three cups of coffee per day, has bacon four days per week, likes his toast hot and is always going to clean out the garage some Saturday afternoon. He has three false teeth, five fillings, a small cavity and needs a hair cut. He shaves once a day with an extra thrown in on appropriate occasions.

"He contributes regularly to the support of his pastor, congressman, poker friends and many others who are not mentioned on his income tax return. He takes reducing exercises regularly three days in a row sometimes and holds his stomach in when people look like they are about to tell him he is getting fat.

"He wears the ties people give him for Christmas and knows some stories about the same color. He can't remember much about the Lady of the Lake or Julius Caesar, but can do a complete rendition of the Face on the Barroom Floor and Our Nell. He reads mystery stories and doesn't peek into the back of the book to see how they come out. He likes certain pictures no matter who painted them, and couldn't tell you for the life of him what Mrs. Soandso wore at the dance.

"He needs a new suit of dinner clothes and there is a rip in his hunting coat. He is supposed to live to be 74, had pains at 22, should have been shot at 30 and feels fine at 48. He has sparrows in the attic, termites in the flooring and mice in the pantry.

"He's going to buy a small farm some day, just outside of town, and live there—and do part of the farm work personally. He's too old to join the army, too young to enjoy social security and too lazy to exercise down to the correct weight. You meet him every day at the bank, in the store, the office, on and street and in front of the mirror.

"P.S. He's a regular guy. You really ought to know him better."

New S. F. P.

■ One of our good friends, who for some reason says he doesn't want us to use his name, writes that the S.F.T.P.A.E.O.B.S.Q.S.I.A.I. may be a fine up-and-coming organization but he has considerable more interest in the S.F.P.C.I.B.S.A.F.P.M.A.S.A., which of course stands for Society for Prohibiting Children in Barber Shops after five P. M. and on Saturday afternoons.

And then he continues: "If there's anything more irritating, or irksome, or plain downright maddening to me than to walk into the barber shop after business hours and find a drove of moppets waiting to have their matted wool shorn, I have yet to experience it.

"Of course a lot of birds work on the premise that their hair grows on company time, so why not have it cut on company time via elongated lunch hours or otherwise. I haven't reached that point of executive abandon as yet . . . probably never will.

"So unless you help to further the cause of the S.F.P.C.I.B.S.A.F.P.M.A.S.A. I guess I'll continue to drum my fingers, tap my right foot, and try to look more irritated at every snip of the scissors, as still another kid's contrary head is wrenched into proper position by patient Tony."

Wouldn't know much about that sort of thing ourselves—haven't had a haircut now for years.

Brain Twister

■ Here's a problem we should have let you wrestle with back when the weather was a little cooler, but if you're in an air-conditioned office maybe you won't have to work up too much of a sweat even now.

You have nine coins, eight of which weigh exactly the same but the ninth one is lighter. You also have an old-fashioned balance scale. To complicate matters, you don't know which of the nine coins is the light one. The problem is to determine which is the light coin by moving the coins on the scales just twice.

The correct answer is worth a free copy of STEEL's Metallic Arc Welding Electrode Handbook.

SHRDLU

Vol. 116, No. 26, June 25, 1945, issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Eritorial Contents—Page 73

WHEN Pearl Harbor first shocked the country into action, "Put it on the Warner & Swaseys," was the battle cry of production men with urgent turning problems. Today, long, weary years later —years in which 3-shift days and 7-day weeks have tested men and machines to the utmost—it is significant to note that Warner & Swaseys are usually the last lathes to be laid off when a contract comes to a close.

Not only that! When the government-owned equipment in a plant is declared surplus, it's usually the Warner & Swaseys that are snapped up first by production-wise managements.

Why? The answer is simple! In the grueling, all-out test of machine tools, these Warner & Swasey machines simply stood up better, produced faster, gave less trouble.

When you plan your next equipment change, remember these war-proved facts. Let a Warner & Swasey Field Engineer help you choose the right Warner & Swasey war-tested turret lathes to boost your peacetime profits!

WARNER & SWASEY
Cleveland

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS... WITH A WARNER & SWASEY

TURRET LATHES, SADDLE AND RAM TYPES—CHUCKING AND BAR TOOLS—PRECISION TAPPING AND THREADING MACHINE

WILL YOUR PLANT NEED MORE

Lifting Power?

This 270-ton giant Alliance gantry crane, recently installed on the Joe Wheeler Dam of TVA, combines unusual construction with beauty of design. The span is 90' . . . the short leg measures 16' and the long leg is 44' in length.

You know us as the **"world's largest builders of the world's largest cranes,"** such as the 270-ton gantry crane shown here . . . or as the originator of new ideas in cranes, such as the multiple range tongs for soaking pit cranes recently announced by us.

But do you know we are working with many customers on the altering of existing lifting facilities, as required by the revamping of a plant for new production?

You may want to relocate or step up the capacity of your present cranes. Alliance specialists can help you with this conversion by increasing or decreasing spans, changing hoist arrangements, or in other ways.

Check with The Alliance Machine Company for cost-saving recommendations on new cranes or reconversion of old cranes.

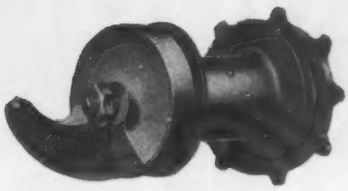
ARMY E NAVY

Alliance

THE ALLIANCE MACHINE COMPANY • ALLIANCE, OHIO

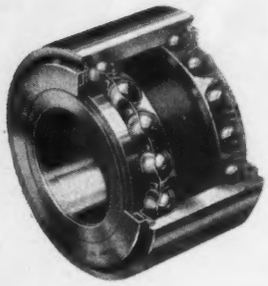
PITTSBURGH OFFICE : 1622 OLIVER BUILDING

FAMOUS "FIRSTS" by NEW DEPARTURE

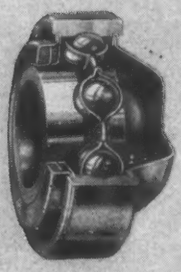


First Bicycle Coaster Brake

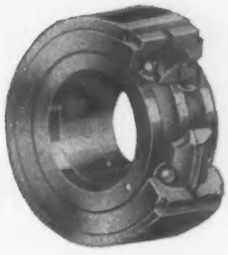
First Yellow Taxicab



First Self-Sealed Lubricated-for-Life Mine Car Bearing

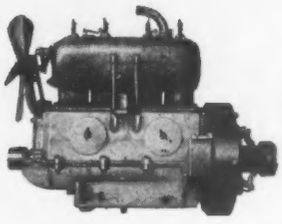


First Conveyor Roll Bearing



First Dual-Purpose Ball Bearing

First Self-Sealed Bearing Lubricated-for-Life

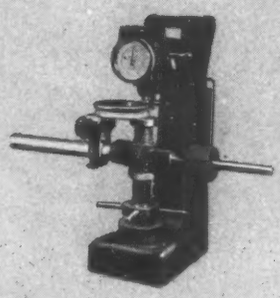


First Engine with Cylinders Cast en Bloc

First Successful Treadle Roll Bearing for Textile Looms

First Fan and Pump Shaft Bearing Self-Sealed and Lubricated-for-Life

3295



Rockwell Hardness Tester

The name New Departure aptly describes an organization whose thought and action has ever been in advance of its time.

A partial record of the "new departures by New Departure" is reported on this page.

Well over 300 million New Departure ball bearings are in this war, and we will stay with this task until the job is done.

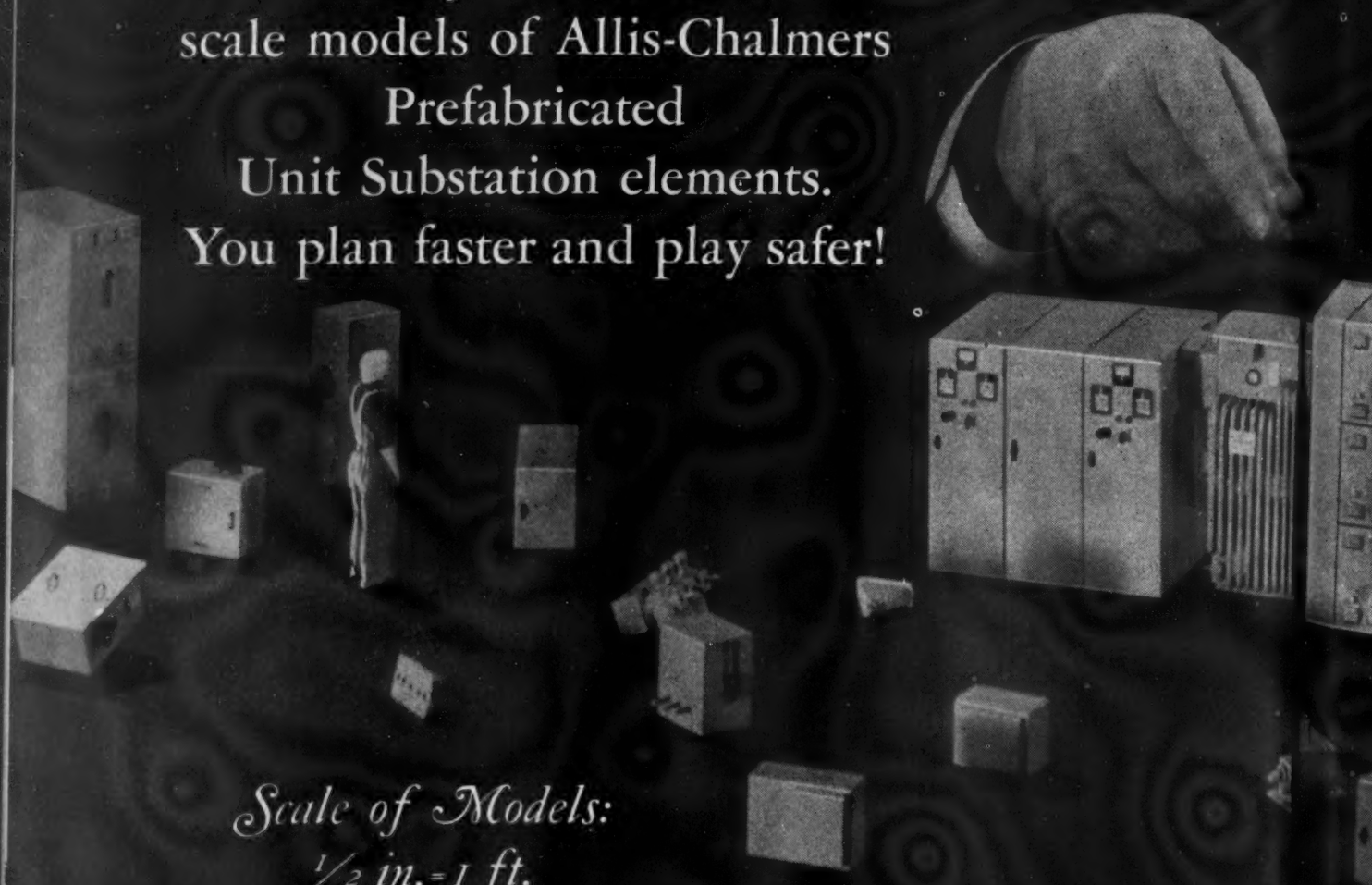
Your future use of ball bearings might well take advantage of New Departure's creative engineering.

Nothing Rolls Like a Ball

EW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT • DETROIT • CHICAGO • LOS ANGELES

Say Goodbye to "BY-GUESS and BY-MEMORY"

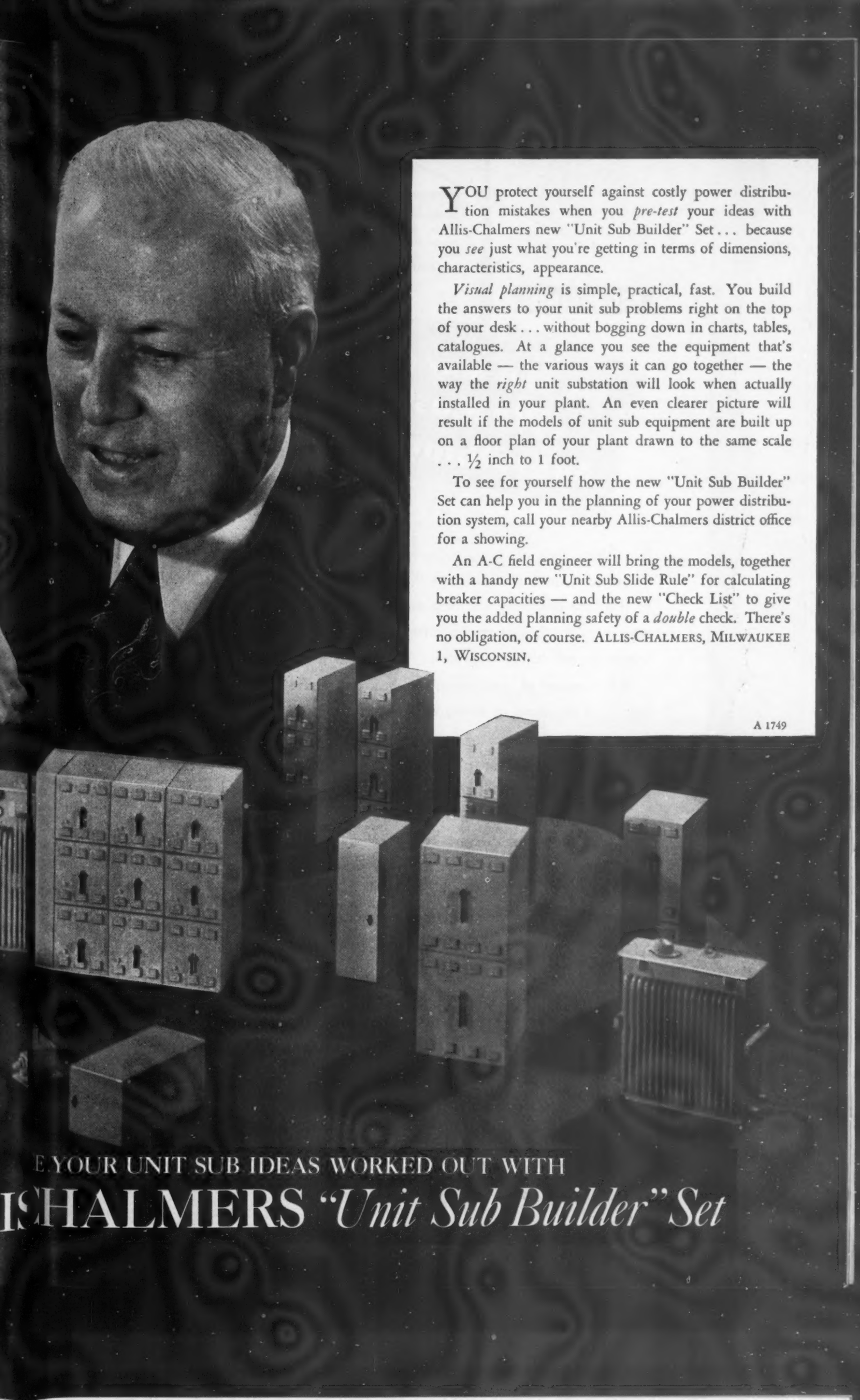
That's what you do
when you plan unit substations
visually — with new
scale models of Allis-Chalmers
Prefabricated
Unit Substation elements.
You plan faster and play safer!



Scale of Models:
½ in. = 1 ft.

E.YO

ALLIS-H



YOU protect yourself against costly power distribution mistakes when you *pre-test* your ideas with Allis-Chalmers new "Unit Sub Builder" Set . . . because you *see* just what you're getting in terms of dimensions, characteristics, appearance.

Visual planning is simple, practical, fast. You build the answers to your unit sub problems right on the top of your desk . . . without bogging down in charts, tables, catalogues. At a glance you see the equipment that's available — the various ways it can go together — the way the *right* unit substation will look when actually installed in your plant. An even clearer picture will result if the models of unit sub equipment are built up on a floor plan of your plant drawn to the same scale . . . ½ inch to 1 foot.

To see for yourself how the new "Unit Sub Builder" Set can help you in the planning of your power distribution system, call your nearby Allis-Chalmers district office for a showing.

An A-C field engineer will bring the models, together with a handy new "Unit Sub Slide Rule" for calculating breaker capacities — and the new "Check List" to give you the added planning safety of a *double* check. There's no obligation, of course. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

A 1749

E YOUR UNIT SUB IDEAS WORKED OUT WITH

I:HALMERS *"Unit Sub Builder" Set*

DISTRIBUTION
When production overbalances distribution, when we fail to distribute what we can produce, production is throttled, jobs are fewer, standards of living decline.
PRODUCTION
WE CAN MAKE ANYTHING
...We Must Sell All of
Everything We Make

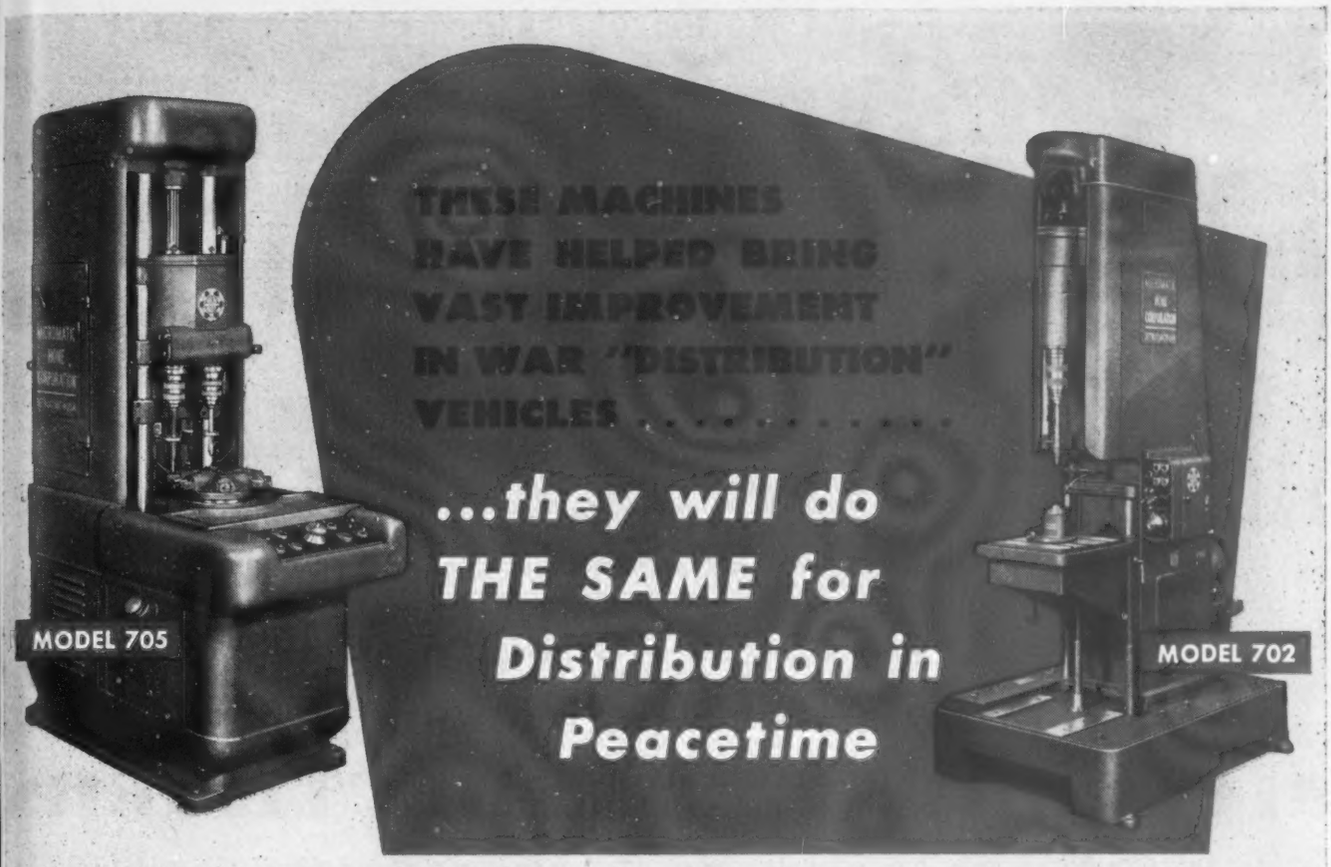
For a long time we in America have derived great comfort and assurance from the knowledge that we have the industrial ability to produce anything we may need or want. We have tied our wagon to the bright star of producing more products at higher wages to sell at lower prices.

This concept of production has brought us the largest expansion in a standard of living of any people in history.

But, while we have always been able to make anything, we have not always been able to sell all of everything we could make. We have not devoted the same enterprising energy to expanding distribution that we have to production. So, in the past, for immediate short swing relief we have resorted to government imposed restrictions on production and distribution. This expedient did not bring worth-while relief, for in the end it added up to fewer jobs, less production—higher prices.

If commerce and industry will use its inspirational ability and ingenuity to find better, cheaper methods of distribution per unit our goal of full employment may easily be accomplished and we can return to the enviable position of enjoying an expanding standard of living.

MICROMATIC HONE CORPORATION
DETROIT 4, MICHIGAN



While cost is a secondary consideration in distribution of war materials, other needs parallel peacetime distribution. Lighter, more easily operated equipment—higher pay loads—easier maintenance, and less of it—are all vital. Micromatic Honing machines have helped wartime distribution to these goals—will do the same for industry after the war. At the same time they will help lower initial and operating costs of distribution machinery—lower costs of goods delivered.

MODEL 705

VERTICAL HYDROHONER

Micromatic Model 705 Multiple Spindle Vertical Hydrohoner has built-in automatic Microsize Control which gauges work automatically—holds within tolerance of .0001" for geometric accuracy and .0003" for *uniform diameter size*—automatically stops honing cycle when correct size is reached. For internal honing or bores ¼" to 2" diameter. Rotary indexing work fixture provides high production. Usually recommended for maximum stock removal ranging from .0005" to .0015" on hardened parts—.001" to .010" on soft or medium hard. (Illustrated above, left).

Precision sphericity without measurable error is generated on ball studs by the Micromatic Ball Stud Honer.

Removes .030" stock on diameter from turned heat treated forgings.

Precision honing of long pieces—external or internal—is the work of the Micromatic Horizontal Floor Type Honer. Either hydraulic or manual control or tools. Set-ups available to generate either cross-hatch or co-directional finish patterns.

MODEL 702 Single Spindle Type HYDROHONER

Single Spindle Type Micromatic Hydrohoner Model 702 for rapid production honing of bores or cylindrical surfaces up to 2" in diameter. (Illustrated above, right).

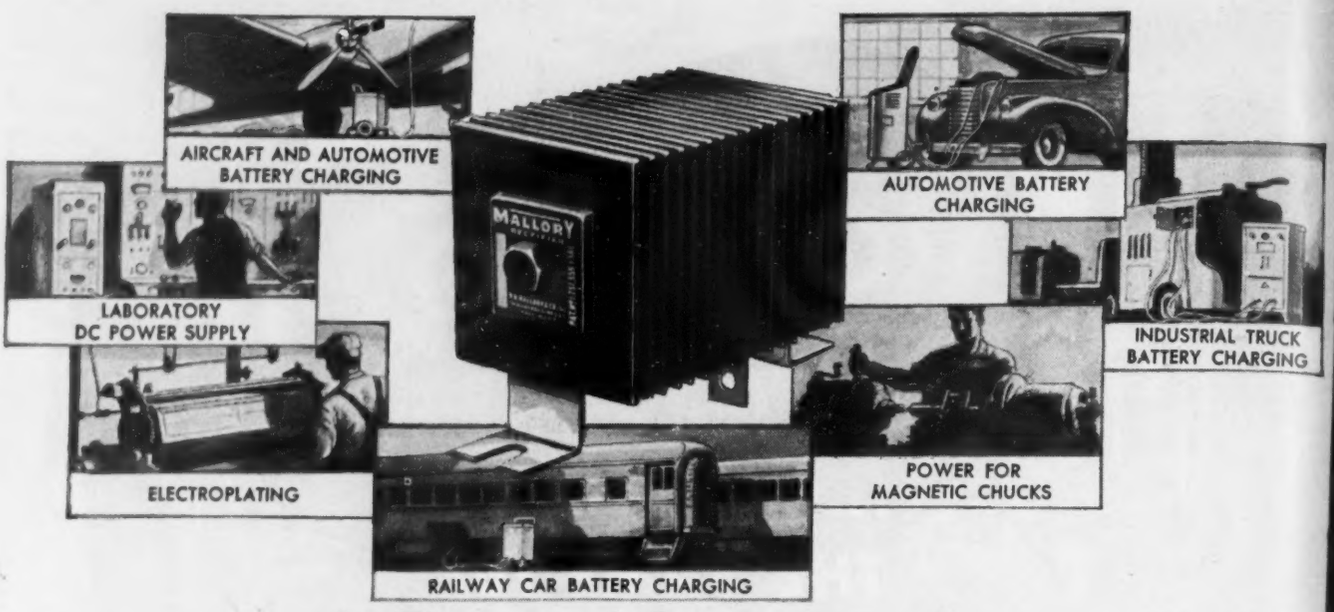
Silver plated bearings are production honed on a Micromatic Horizontal. Costs were reduced 50% from previous methods.

MICROMATIC HONE CORPORATION

DETROIT 4, MICHIGAN

DISTRICT OFFICES: 614 Empire Building, 206 South Main Street, Rockford, Illinois • 129 Church Street, New Haven 10, Connecticut
501 Harries Buildin 137 North Main Street, Dayton, Ohio • 1031 South Broadway, Los Angeles 15, California

MAKERS OF HONING MACHINE TOOLS



A Dozen Advantages for Dozens of Applications...

MALLORY MAGNESIUM-COPPER SULPHIDE RECTIFIERS

WHEREVER you need a dependable source of low voltage DC, Mallory Dry Disc Rectifiers provide these 12 advantages:

1. *Long Life*—Properly applied, many Mallory Rectifiers have been in continuous operation for more than five years!

2. *More compact* than any other dry disc rectifier because the high current rating of the rectifier junction permits much smaller size.

3. *Rugged, all-metal construction* — practically immune to mechanical damage and able to withstand severe shocks or sustained vibration.

4. *Completely sealed* to resist atmospheric extremes.

5. *Constant output* over a range of ambient temperatures from —40°F. to 265°F. or higher. No "aging"—constant output throughout the rectifier's long life.

6. *Will withstand heavy current overloads* — tested up to 527°F.

7. *Self-healing rectifying film* if subjected to abnormal high voltage surges.

8. *Excellent voltage regulation* over a wide range.

9. *Unity power factor.*

10. Practically no *power consumption* at "no load".

11. *Silent operation—no maintenance cost,* since there are no moving parts to wear out.

12. *Wide range of sizes and ratings*—Mallory Rectifiers are available in sizes ranging from a tiny "button" to large heavy-duty stacks, in capacities from 0.3 ampere to 175 amperes DC and higher.

Mallory manufactures the following complete rectifier units: Rectostarters* for aircraft . . . Battery chargers for automotive, aviation, railroad and industrial truck service . . . Rectopower† supplies for low voltage, medium and high current applications.

Write for descriptive catalogs, showing specifications and many applications of Mallory Magnesium-Copper Sulphide Rectifiers. Our engineers will be glad to help if you have a special problem. Or see your nearest Mallory Distributor.

†*Rectopower is the registered trademark of P. R. Mallory & Co., Inc., for rectifier power supply units.*

P. R. MALLORY & CO., Inc.,
INDIANAPOLIS 6, INDIANA

**Rectostarter is the registered trademark of P. R. Mallory & Co., Inc. for rectifier units for use in starting internal combustion engines.*

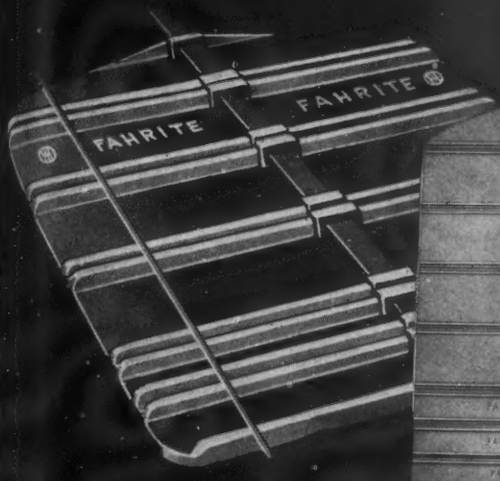
P. R. MALLORY & CO. Inc.
MALLORY RECTIFIERS

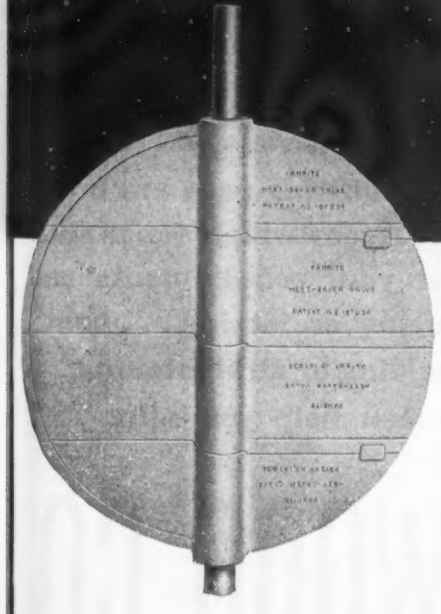
MAGNESIUM COPPER SULPHIDE RECTIFIERS—
STATIONARY AND PORTABLE D. C. POWER SUPPLIES—
BATTERY CHARGERS AND AVIATION RECTOSTARTERS*

Insure better performance at lower installation and maintenance costs... get Heat Saver Valves in

FAHRITE

HEAT AND CORROSION *Alloys*





FAHRITE Heat Saver Valves, like all other FAHRITE castings, retain their efficiency even under sustained elevated temperatures. FAHRITE Heat Saver Valves are simple—mechanisms are less costly—providing lighter weight, greater ease of operation and lower B.T.U. loss. There's no accumulation or coking at seat from cooling, no failure due to muddy or acid water. And finally, these valves do not grow, warp, crack, oxidize or corrode.

These and other FAHRITE castings can be supplied to custom specifications in the grade exactly suited to your operating conditions.

The Ohio Steel Foundry Co.

Springfield, Ohio

Plants at Lima and Springfield, Ohio

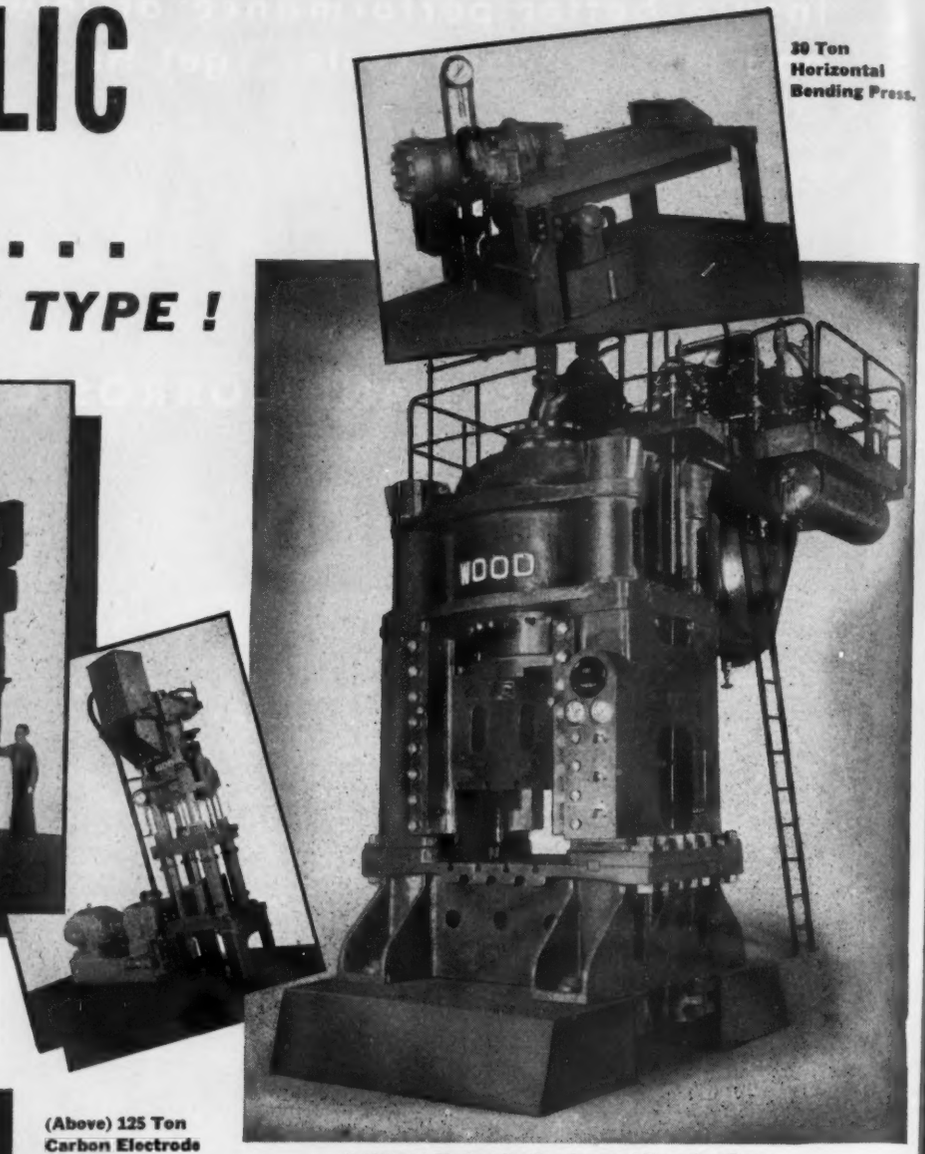
ENGINEERS
FOUNDERS
MACHINISTS

ARMY E NAVY

FREE ENTERPRISE IS THE ONLY WAY TO CONSTANTLY HIGHER AMERICAN LIVING STANDARDS

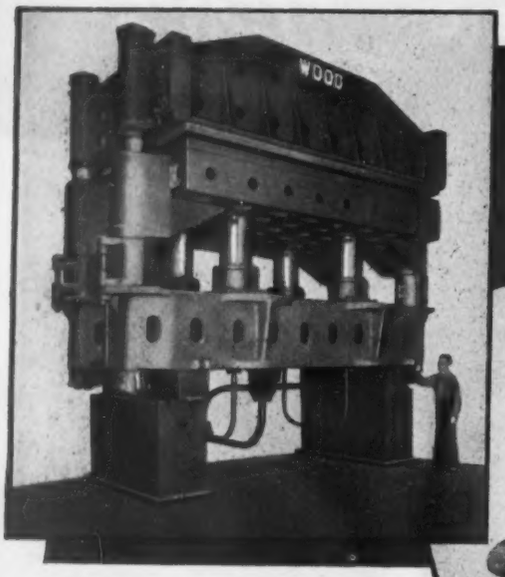
HYDRAULIC PRESSES....

OF EVERY TYPE!

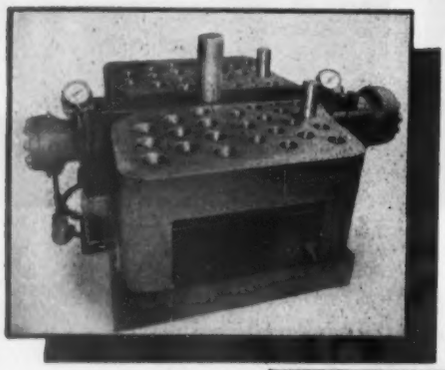


30 Ton Horizontal Bending Press.

2,000 Ton Hydraulic Forging and Forming Press.



(Above) 800 Ton Wall Board Press with Platen Size of 9'1" x 13'10".



(Above) 125 Ton Carbon Electrode Stub Press.

(Above) Double-ended Pipe Bending Press of 62½—125 Ton Capacity.

★

Joggling Press of 350 Ton Capacity.

The presses shown on this page are but a few of the many types which we manufacture. Whether your requirements call for forging, flanging or forcing . . . bending, joggling, molding or straightening . . . Wood engineers can help you solve your press problems.

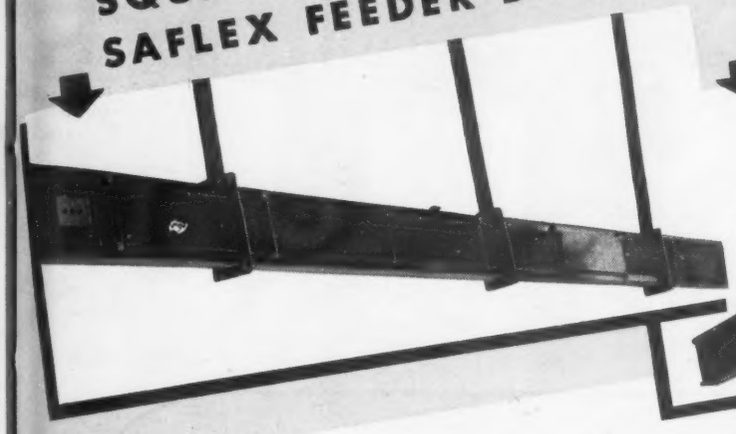
R. D. WOOD CO.

PHILADELPHIA • PENNSYLVANIA

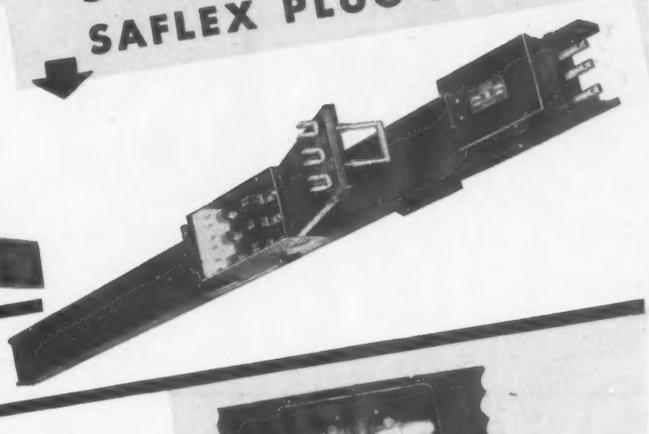
HYDRAULIC PRESSES FOR EVERY PURPOSE

FOR EFFICIENT POWER DISTRIBUTION

SQUARE D SAFLEX FEEDER DUCT

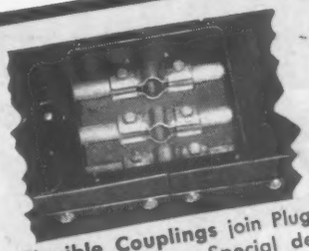


SQUARE D SAFLEX PLUG-IN DUCT



Square D Saflex Feeder Duct is designed to serve as the feeder between transformer banks and main switchboard or as feeders to branch circuits where minimum voltage loss is essential. Because of its low reactance and consequent balanced low voltage drop (1.8 volts per 100 feet) it is ideally suited for welder circuits —enables conductor size to be kept at a minimum. Feeder duct is available in standard 10-foot sections with special fittings to meet all types of installations. WPB sizes of 800, 1000, 1350 and 2000 ampere capacities.

Square D Plug-In Duct is a perfect running mate for Feeder Duct. It permits plugging-in machines whenever and wherever they are needed. Units are easily attached and disconnected. 100% salvage for re-use. Available in 250, 400 and 600 ampere capacities.



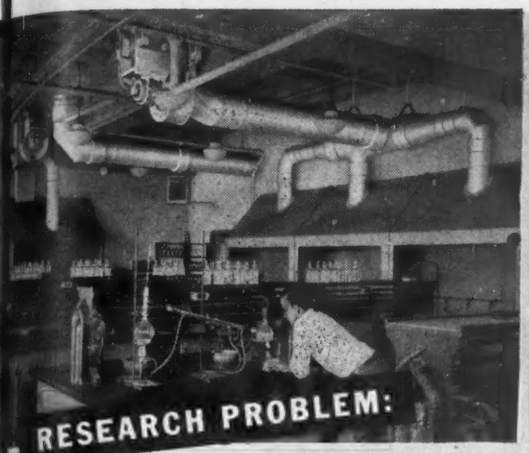
Flexible Couplings join Plug-In-Duct bus bars. Special design permits expansion or contraction to be absorbed at the joint, and also provides flexible connections for correction of minor variations in bus alignment. Notice use of round tubular buses which afford highest possible mechanical strength when subjected to heavy short circuit stresses.

Units Easy to Attach. Hook-type bracket on top of plug-in unit attaches to top of duct. Unit is then swung down and jaws snap into position on bus bars—tightened securely with a single screw—on or off in a jiffy. 10 units may be attached to each 10′ section.

SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

PLATING PROBLEM:
Toxic fumes dangerous to health; corrosive fumes ruinous to equipment must be banished quickly, thoroughly. A complete system engineered into small space was the Sturtevant answer that makes this formerly hazardous job, now safe. Plus faster setting up and operation.
Fume Problems Once—
"Success Stories" Now!
PROCESS PROBLEM:
Typical of many operations where noxious fumes are created is the spinning of synthetic thread. To keep hydrogen sulfide fumes from escaping into the room, each Sturtevant System withdraws large amounts of air directly from the machines, supplies uniform replacement air. Results: Uninterrupted production, elimination of spoilage.

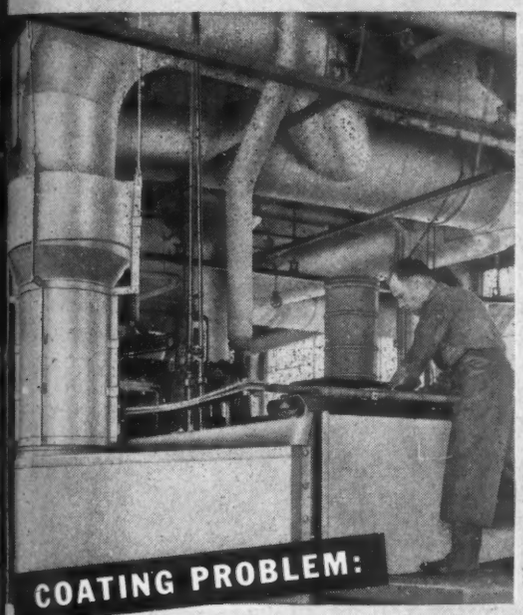


RESEARCH PROBLEM:

When this chemical laboratory is filled with technicians, each working on a different project, an adequate fume control system is a "must." Notice the wide hoods that trap noxious odors and dangerous vapors, leaving the large center area unobstructed, shadow-free, clean.

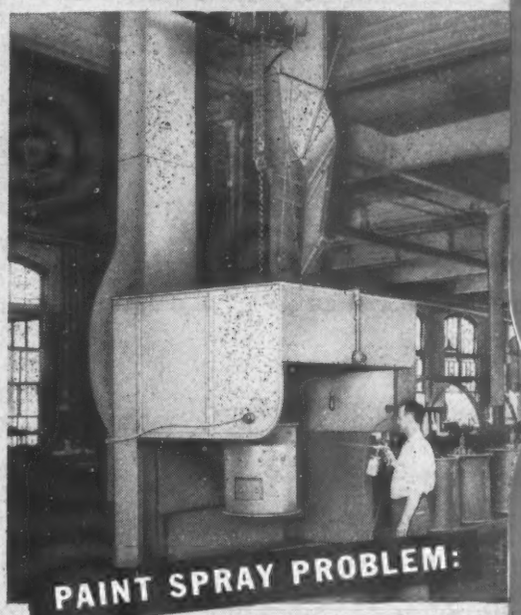
CLEANING PROBLEM:

Cleaning and degreasing baths for small metal parts pose a pretty question, especially when mass production is required. Here, with this long row of tanks, strategic location of hoods and fans plus correctly engineered duct work, gives operators fume-free air and plenty of working room.



COATING PROBLEM:

Note how this anodic finishing bath is freed of the conventional overhead hood. The individual fume remover located at the side and end of the tank captures the dangerous vapors more efficiently. Duct design cuts power costs; more "elbow room" for operators speeds work.



PAINT SPRAY PROBLEM:

Fume-laden air can play havoc with men, machines and production rates. But this Sturtevant Engineered System fits right over the production line, "fences-in" the work and carries off fumes. Operator handles more parts—is not encumbered by a respirator.

VENTILATING

DRYING

HEATING

MECHANICAL DRAFT

DUST AND FUME CONTROL

AIR CONDITIONING

EVERY CASE PICTURED HERE—and hundreds more like them—is the result of asking—and getting an *engineered* answer to a lot of questions. Questions like these: Which type of fan? The best place to locate it? How should the duct work be set up? How to handle the fumes after they are collected? How about replacement air? Are power and maintenance costs held to a minimum?

Answer these questions—*but answer them right*—and you get a Fume Control System that leaves nothing to be desired, in efficiency and economy. But, that takes a lot of "know-what" and "know-how". From Sturtevant you get both! Our engineers have the complete Sturtevant Line to work with—*all* types of air handling equipment—instead of trying to solve problems with one or two. In addition, they have an 85 year fund of experience—throughout the length and breadth of industry—to draw upon. It all adds up to a "success story" for *your* fume problem.

B. F. STURTEVANT COMPANY
Hyde Park Boston 36, Mass.

Sturtevant
REG. U. S. PAT. OFF.
Puts Air to Work

IS IT LATER THAN YOU THINK?

Oiljak, like other American manufacturers, continues to devote all its facilities to the production of war material, to speed the approaching day of victory.

Yet, at the same time, we consider it no less our duty to plan for the future, to do our part in easing the change-over to a healthy industrial economy during the competitive peacetime years that lie ahead of American industry.

Oiljak offers you complete manufacturing facilities with up-to-date machines operated by men whose production record on war contracts compares favorably with normal peacetime costs; a record achieved by a minimum of rejections, a steady streamlined flow of work and materials through the plant, and a special assembly-line technique for which Oiljak is famous.

So before you set up the manufacturing procedure for *your* peacetime products, it may well be worth your while to get acquainted with all the facilities which Oiljak can offer you.

MACHINING · STAMPING · WELDING · PLATING · FINISHING · ASSEMBLING

METAL MANUFACTURERS

THE OILJAK MANUFACTURING Co., INC.

MONTCLAIR, NEW JERSEY

THE JOB COMPLETE FROM BLUEPRINT TO FINISHED PRODUCT

R THE FIGHTERS OF TODAY AND THE FLAGSHIPS OF TOMORROW

Another tough cleaning problem olved by "THE PENN SALT MAN!"

THE aircraft industry has offered some of the toughest metal cleaning and plating roblems in war production plants. It has been ur privilege to be helpful through our prodcts and our men in the solution of many such roblems. Both the men and the products of enn Salt's Special Chemicals Division are preared not only for these war-time services but e equally well prepared for reconversion and e problems of the future.

ere is an actual case of a leading aircraft gine manufacturer, drawn from our files:

BEARINGS
(AIRCRAFT)

PRODUCTS USED: PENNSALT CLEANERS EC-10, No. 37, and K-7 BEFORE LEAD PLATING WITH PENNSALT LF-42

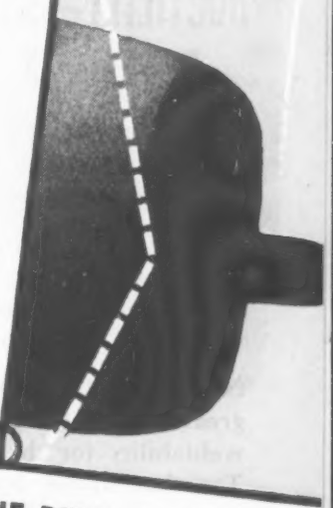
PROBLEM: To remove slushing oil from copper-lead alloy and silver plated steel bearings prior to lead plating.

EQUIPMENT: Plating done in individual pyrex glass plating tanks, large enough to accommodate one bearing. Conventional soak and electrolytic cleaning tanks.

OUR METHOD:

1. Preclean with Pennsalt EC-10 (solvent dip) followed by spray water rinse.
2. Soak clean in Pennsalt #37, 6 oz/gal., 5 to 10 minutes, 190 to 200° F.
3. Hot water rinse.
4. Electroclean in Pennsalt K-7, 8 oz/gal., 190° F., 15 to 30 seconds—work made the cathode.
5. Hot water rinse.
6. Lead plating solution made up of one part Pennsalt LF-42 to two and one-half parts water —with glue addition. Used at room temperature, 15 amps./sq. ft., for 28 minutes, which plates .001" thickness.
7. Cold water rinse.
8. Cyanide dip.
9. Indium plate.

COMMENTS: This cycle employs four Pennsalt Products.



"THE PENN SALT MAN" FIRST A TECHNICIAN . . . THEN A SALESMAN

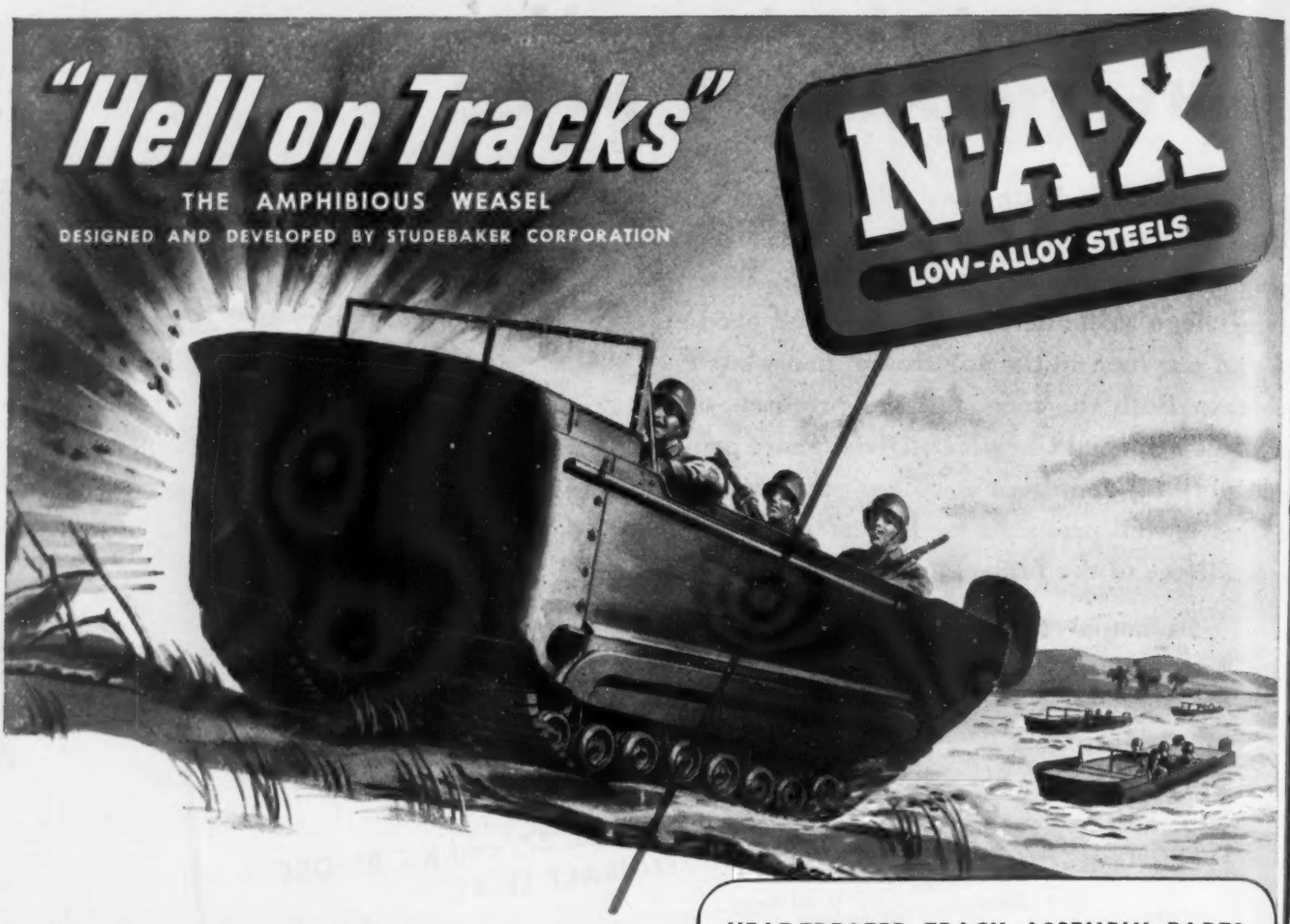
Penn Salt Special Chemicals Division men are well trained in the application of chemicals to industry's problems. If you have a metal cleaning problem, don't hesitate to seek the advice of "THE PENN SALT MAN." He will advise you without obligation.

SPECIAL CHEMICALS DIVISION

ENNSYLVANIA SALT
ANUFACTURING COMPANY
Chemicals

00 WIDENER BUILDING, PHILADELPHIA 7, PA.

York • Chicago • St. Louis • Pittsburgh • Cincinnati • Minneapolis • Wyandotte • Tacoma



DUCTILITY—STRENGTH—TOUGHNESS PUT N-A-X 9120 ON THE JOB

The track assembly parts of the amphibious Weasel call for something pretty special in *steel* to meet the requirements.

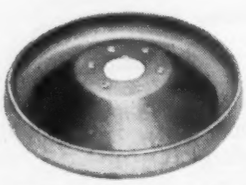
It must have *ductility* to permit cold-forming into difficult stampings. And it must have good *hardenability* and response to heat-treatment to make it strong and tough.

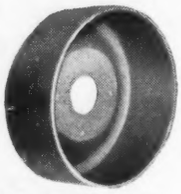
N-A-X 9120 combines these properties in one great steel, and provides in addition excellent weldability for the fabrication of the track shoe. Together, these track parts furnish a good example of the outstanding work being done with versatile N-A-X alloy steels. Consult Great Lakes for assistance in determining the best steel of this series for your particular requirements.

HEAT-TREATED TRACK ASSEMBLY PARTS COLD-FORMED OF N-A-X LOW-ALLOY STEEL

CROSS PLATE

GUIDE


BOTTOM GUIDE WHEEL


TOP GUIDE WHEEL

SHOE

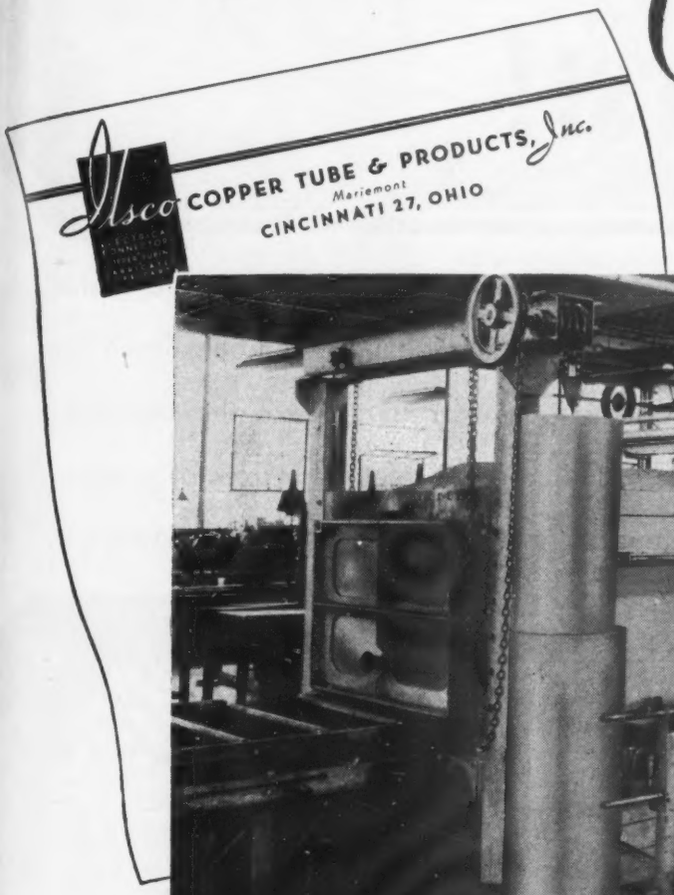
GREAT STEELS FROM GREAT LAKES

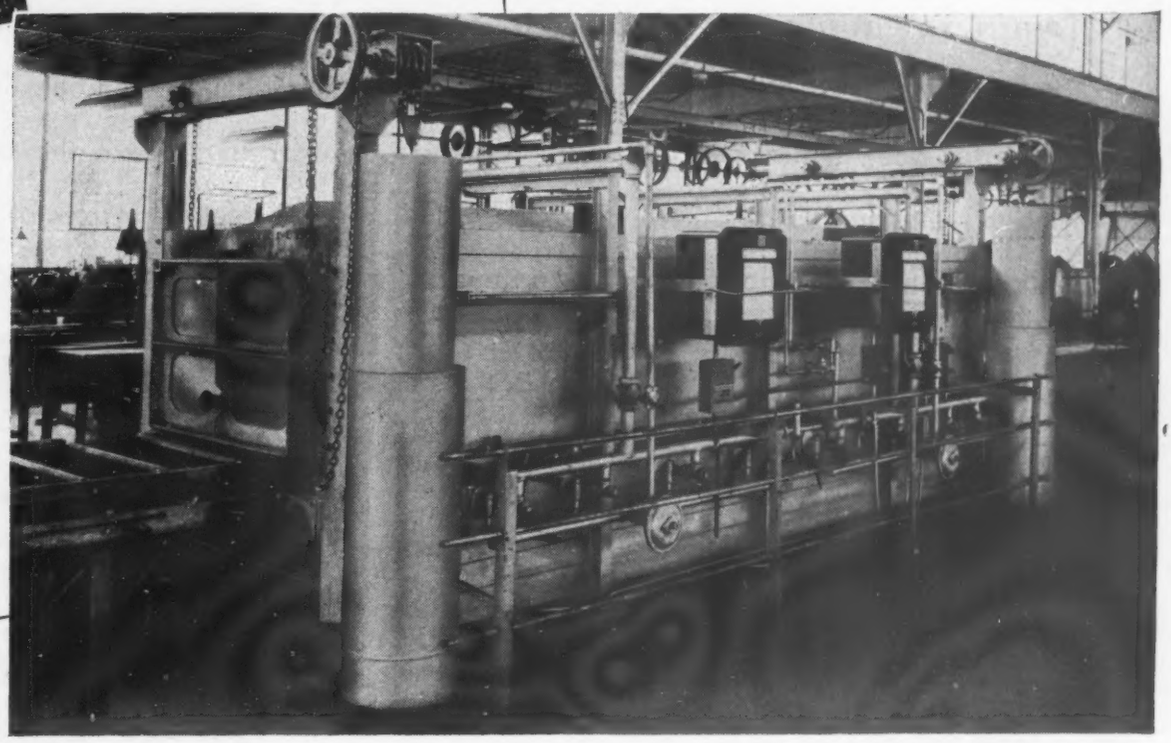
GREAT LAKES STEEL
Corporation

N-A-X ALLOY DIVISION · DETROIT 18, MICHIGAN

UNIT OF NATIONAL STEEL CORPORATION

FABRICATOR FINDS { Production Doubled, Costs Down, Rejects Eliminated WITH NEW GAS FURNACE





The Ilsco Copper Tube & Products, Inc., of Mariemont, (Cincinnati), Ohio, fabricator of copper alloy products including tubing, connectors and electrical switch parts, recently installed a new copper annealing Gas furnace. Studies of its operation have shown that production has doubled, a decrease in fuel costs has been noted and loss through rejects eliminated.

Further advantages in exacting temperature control and adaptability to production line technique are mentioned by Mr. A. H. Stubbers, President of the Company. Although production has doubled, this new Gas furnace occupies no more space than its predecessor.

Learn, for your own profit and improved production, of the advantages of Gas and Gas equipment. Your local Gas Company's Industrial Engineer will advise you, without obligation.

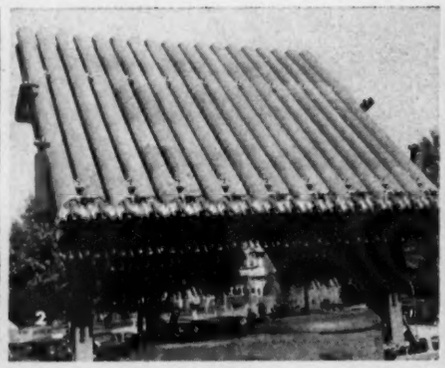
THE TREND IS TO GAS
FOR ALL INDUSTRIAL HEATING

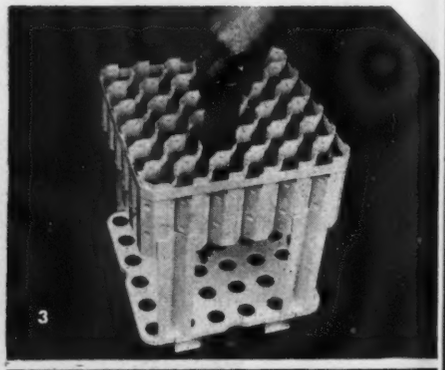
AMERICAN GAS ASSOCIATION
INDUSTRIAL AND COMMERCIAL GAS SECTION
420 LEXINGTON AVENUE, NEW YORK 17, N. Y.

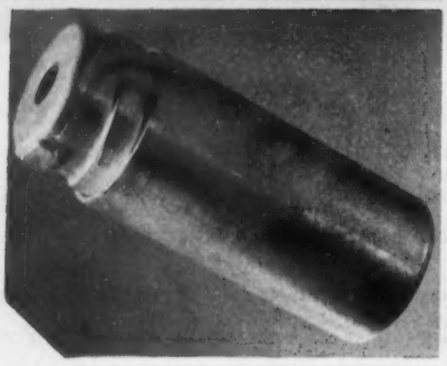
BUY WAR BONDS . . . HELP SPEED VICTORY!

Think of Stampings First!

WHEN YOU THINK of post war products be sure to consult with pressed metal experts *before you begin designing*. Stampings and stamping assemblies have for decades been a keystone of mass production. In war and peace the stamping industry has served all other industries . . . helping to achieve miracles of production . . . higher standards of living . . . a more powerful and prosperous America.

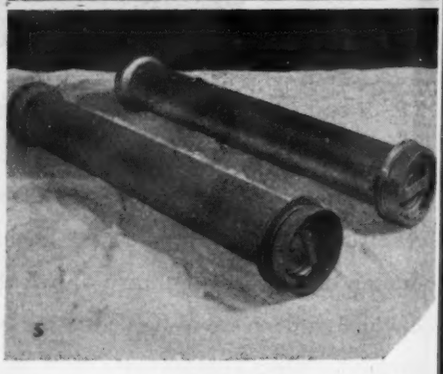






A FEW OF THOUSANDS OF WAR PRODUCTS MADE OF STAMPINGS

1. COINING TO CLOSE DIMENSIONS
2. ROCKET LAUNCHER TUBES
3. WELDED AMMUNITION BOX
4. HYDROSTATIC FUSE ASSEMBLY
5. 3' CARTRIDGE CONTAINER



***THINK** of the incredible growth of the stamping industry during the war. More stampings have been made during the past two years than during the preceding ten. The experience gained by the industry as a result of this expansion will revolutionize thousands of products postwar. When you plan ahead plan to save time and money—think of stampings first!*

The Pressed Metal Institute is a nationwide association of leading pressed metal manufacturers, organized to advance the art and to assist other industries to take full advantage of latest stamping methods and techniques.

ADVANCE WITH STAMPINGS
PMI
PRESSED METAL INSTITUTE

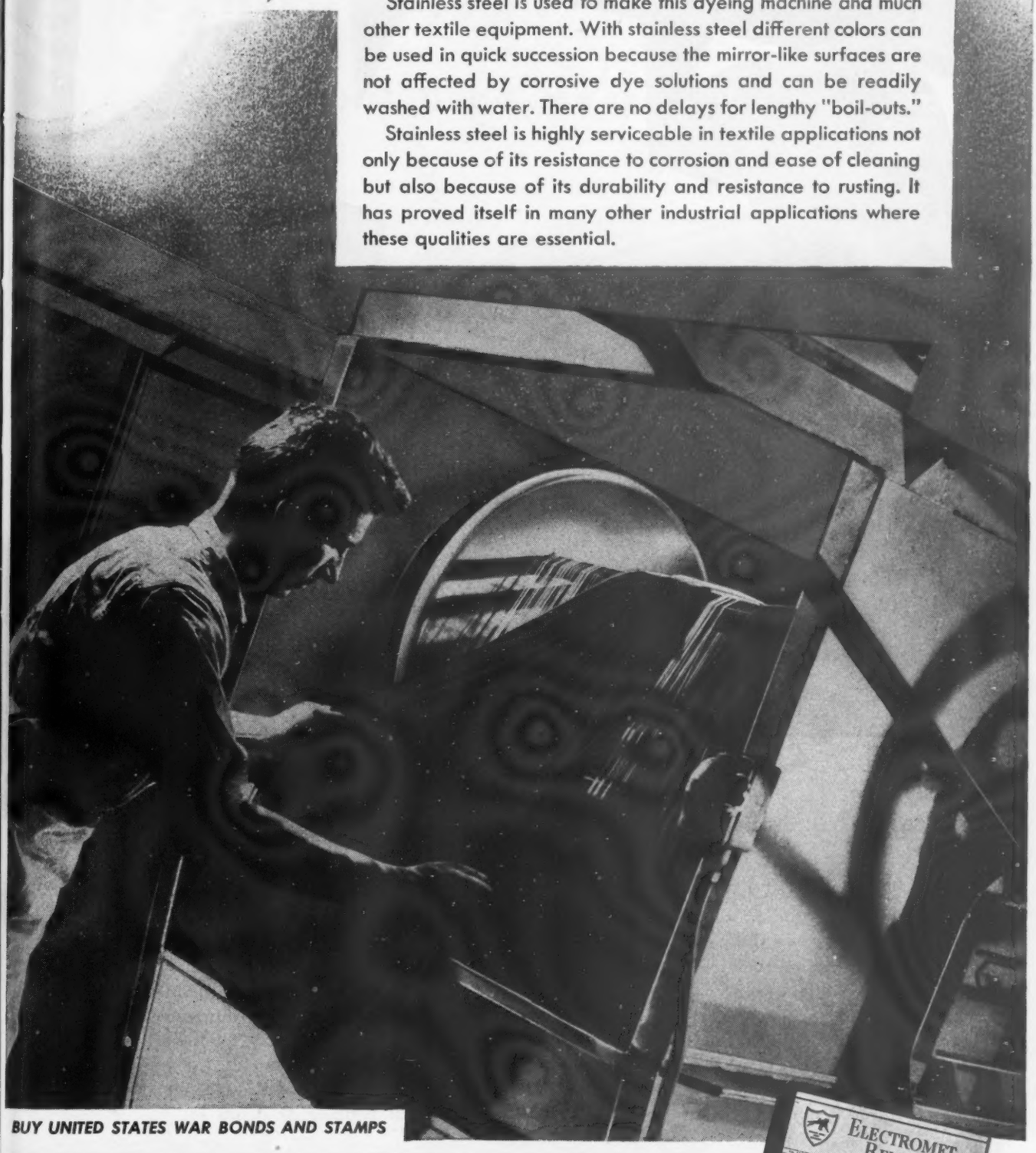
PRESSED METAL INSTITUTE

829 UNION COMMERCE BLDG. · CLEVELAND 14, OHIO

Many Colors in a short time

Stainless steel is used to make this dyeing machine and much other textile equipment. With stainless steel different colors can be used in quick succession because the mirror-like surfaces are not affected by corrosive dye solutions and can be readily washed with water. There are no delays for lengthy "boil-outs."

Stainless steel is highly serviceable in textile applications not only because of its resistance to corrosion and ease of cleaning but also because of its durability and resistance to rusting. It has proved itself in many other industrial applications where these qualities are essential.



BUY UNITED STATES WAR BONDS AND STAMPS

Other interesting uses of stainless steel are described in ELECTROMET REVIEW, published by ELECTRO METALLURGICAL COMPANY, the Unit of UNION CARBIDE and CARBON CORPORATION that produces alloys for making steel. If you are an executive, engineer, or designer you can be put on the mailing list for ELECTROMET REVIEW by sending your name on your business letterhead to ELECTRO METALLURGICAL COMPANY, Room 328, 30 East 42nd Street, New York 17, N. Y.

—Advt.

Presteel Solves a Problem for Typewriter Manufacturer

This manufacturer had always made its own stampings, and had tooled up to produce the steel ribbon cover shown above. Difficulty was experienced in providing enough metal for the rear overhang without wrinkling the top surface. So Presteel was called into the picture, and—as usual—solved the problem.

This manufacturer, incidentally, uses Presteel Cold Rolled Strip Steel for much of its own stamping production.

Few industries have not availed themselves of the services of the Worcester Pressed Steel Company. In all likelihood Presteel has contributed to the development of interchangeable parts for many of the machines in your own offices and shops. Why not investigate the possibilities for lowering costs and improving the quality of your own products by the use of Presteel metal stampings. Mail samples or prints to:

WORCESTER PRESSED STEEL CO.

406 BARBER AVENUE, WORCESTER 6, MASS.

ALLOY STEELS AND OTHER METALS COLD FASHIONED SINCE 1883

HEADQUARTERS FOR FACTS

about Used Machines

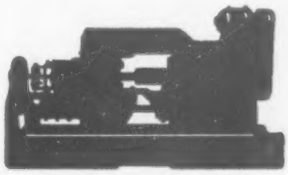
The value of a used Acme-Gridley Automatic as a production machine depends not on its catalog description, but on what it can turn out *today*.

For the facts, look to the men who design, build and tool these machines. They really know.

They can tell you if the "surplus" machine you might think of buying has been overworked or under-cared for. And whether it is a good buy at the reduced price, or at any price.

It pays to remember that the purchase price of any machine tool, old or new, must come back to you through production.

So, we urge you to seek competent advice before buying. Then buy a used Acme-Gridley *only* if it will help you reduce your cost of manufacture. Buy only machines that will improve your position, by cutting costs, in the highly competitive markets that are ahead.

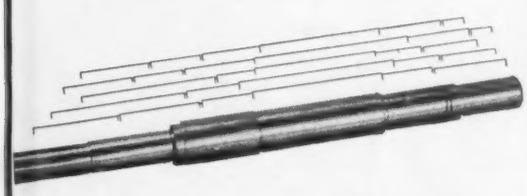


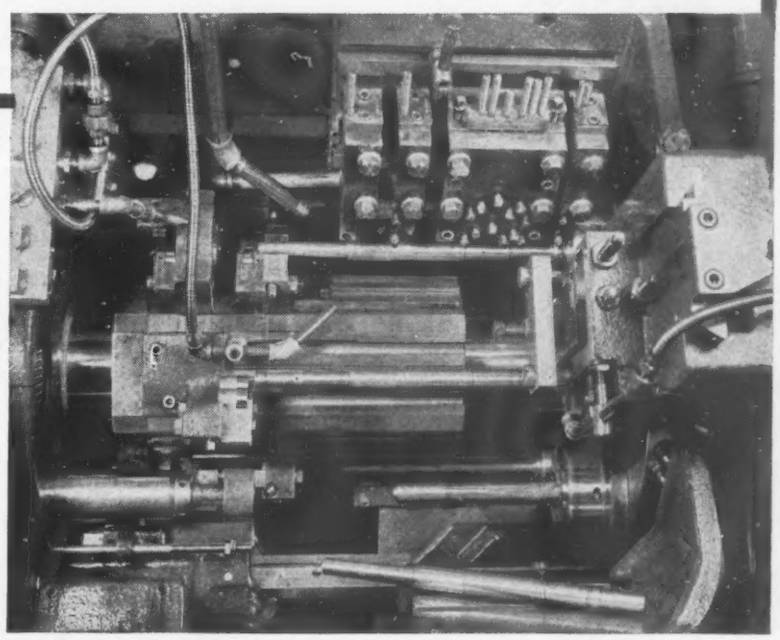
ACME-GRIDLEY BAR and CHUCKING AUTOMATICS maintain accuracy of the highest spindle speeds and fastest feeds modern cutting tools can withstand.

A CASE OF COST REDUCTION

Acme-Gridley tooling makes it possible to machine all diameters of this motor shaft on one set-up, with high precision and concentricity. Time saved in set-up, in turning and investment—no one-purpose shaft machine to buy.

Sketch indicates the variety of shaft work that can be done with one set of tools, on the standard Acme-Gridley Bar Automatic.





THE NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

Your telephone might be like this!

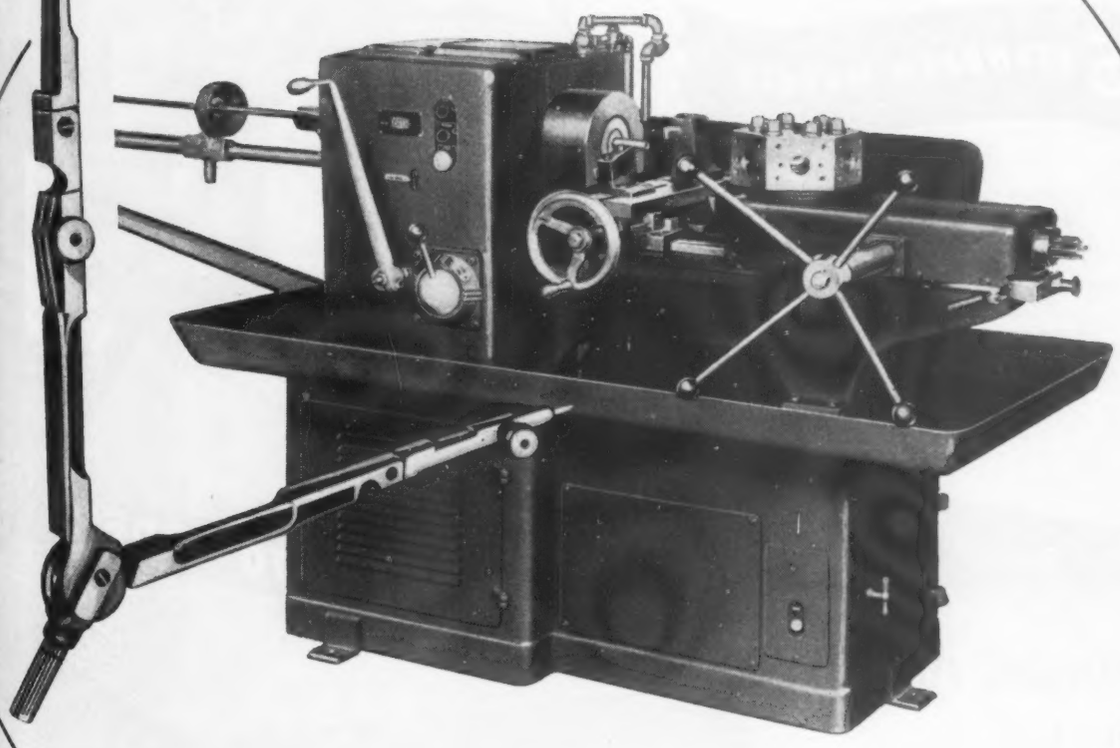
Simplification is the order of the day. A telephone to which you listen and into which you talk, without having to hold a transmitter, is a future possibility. Similar improvements will be made in many other familiar products, and you will see too, a great variety of new things. Many of these will call for wider use of the light alloys—aluminum and magnesium. Bohn engineering and research facilities will be at your disposal, in making the widest possible use in your products of the many sales and operating advantages of these light alloys.

BOHN ALUMINUM AND BRASS CORPORATION, DETROIT 26, MICHIGAN

GENERAL OFFICES—LAFAYETTE BUILDING

Designers and Fabricators—ALUMINUM • MAGNESIUM • BRASS • AIRCRAFT-TYPE BEARINGS

WIDER CIRCLE OF APPLICATIONS



Widely used in vital war production plants as a *SIMPLIFIED* lathe on numerous bar and chucking operations, the Oster No. 601 "RAPIDUCTION" is now developed to include a still wider circle of applications. Among these recent developments are the following:

1. New 4-speed motor permits four speed changes without change of sheaves. (2-speed motor optional.)
2. Motor is mounted on oil-resistant rubber to insure smooth, quiet operation.
3. Individual ⅛ H. P. motor now operates coolant pump to provide uniform flow of lubricant, independent of spindle speeds.
4. New electrical controls have speed selector switch located conveniently for the operator.
5. Increased rigidity of the machine is insured with longer base of heavier construction.

More than ever, the Oster No. 601 "RAPIDUCTION" lathe offers you "custom-built value" at an economical price. Optional WORM drive or DIRECT drive, as required. Six position turret is automatically indexed. Automatic chuck capacity 1½" round bar.

Inquiries are invited but deliveries are uncertain due to conditions beyond our control.

OSTER

"Rapiduction" LATHES

THE OSTER MANUFACTURING COMPANY • 2037 EAST 61ST STREET, CLEVELAND 3, OHIO, U. S. A.

UNITED

PORTABLE SHEARS

For Cropping and Dividing

5 STANDARD MODELS

Capacities to 2½" Square Hot Soft Steel at Temperatures from 1200° F. *to* 1400° F.

SPECIAL DESIGNS TO ORDER

OUTSTANDING FEATURES

- Low First Cost
- Rugged, Compact Construction
- Economical Maintenance
- All Mechanical Parts Fully Enclosed
- Furnished for Either Right Hand or Left Hand Operation
- May Be Used also for Cold Cutting Lighter Sections
- Occupies Only 24" x 24" Floor Space

UNITED PORTABLE SHEARS are designed especially for uses where the need does not justify a large investment, but where production capacity is increased by having a small shear available.

More than 40 units are at present contributing to the economical operation of merchant mills in plants throughout the United States and foreign countries.

UNITED engineers will gladly recommend a suitable shear for *your* requirements. Consult us freely.

UNITED ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh · Vandergrift · New Castle · Youngstown · Canton
Subsidiary: Adamson United Company, Akron, Ohio
Affiliates: Davy and United Engineering Company, Ltd., Sheffield, England
Dominion Engineering Works, Ltd., Montreal, P. Q., Canada
Makers of Rolls and Rolling Mill Equipment

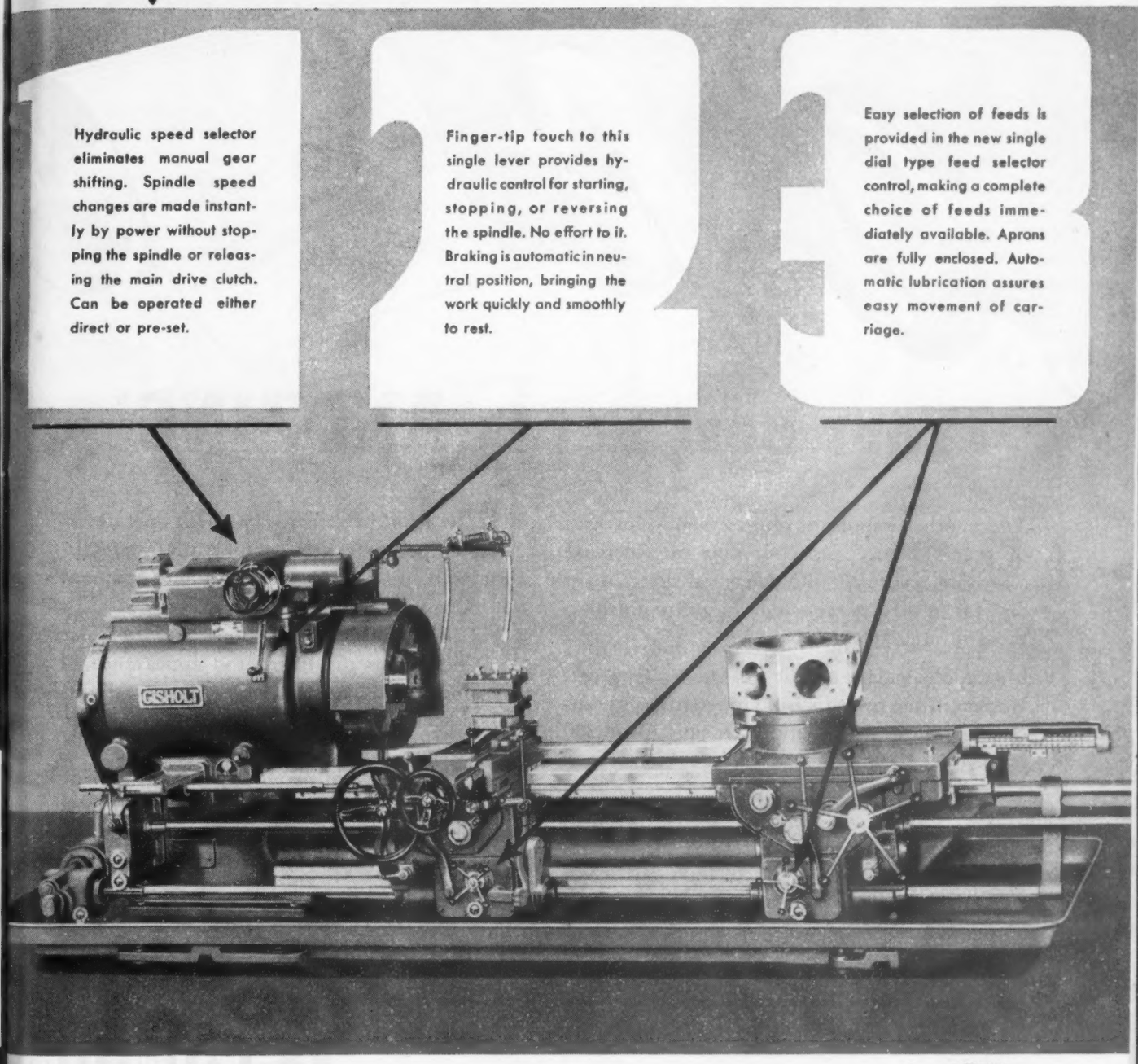
Easier Operation

HERE'S a 20,000-pound machine that requires no more operating effort than turret lathes approximately ⅓ its weight. Despite its great power and rigidity for heavy duty work, the new Gisholt 4L Saddle Type Turret Lathe is so fast and responsive it can handle light work of both large and small diameters. With many machine functions entirely automatic, waste time is eliminated. Fatigue is reduced to a new minimum. Training time is shortened. Operator output is faster—more nearly constant throughout the day.

1 Hydraulic speed selector eliminates manual gear shifting. Spindle speed changes are made instantly by power without stopping the spindle or releasing the main drive clutch. Can be operated either direct or pre-set.

2 Finger-tip touch to this single lever provides hydraulic control for starting, stopping, or reversing the spindle. No effort to it. Braking is automatic in neutral position, bringing the work quickly and smoothly to rest.

3 Easy selection of feeds is provided in the new single dial type feed selector control, making a complete choice of feeds immediately available. Aprons are fully enclosed. Automatic lubrication assures easy movement of carriage.



The new Gisholt 4L Saddle Type Turret Lathe provides 31⅜" swing over the ways; 27" swing over carriage wing and 63" longitudinal working travel of turret carriage to accommodate an unusually wide range of work. Ask Gisholt engineers about this modern, easier-operating Gisholt as applied to your specific machining requirements.

GISHOLT MACHINE COMPANY • 1217 *E. Washington Ave., Madison 3, Wis.*

Look Ahead... Keep Ahead... With Gisholt Improvements in Metal Turning

GISHOLT

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES • SPECIAL MACHINES

EXTRA CORROSION RESISTANCE

Applied Continuously to ZINC-COATED WIRE—STRIP—SHEETS

Your Best Bet is ANOZINC*

Add another important plus to the big features of the ANOZINC process! You can increase corrosion resistance of zinc-coated sheets, strip or wire *in a continuous operation* by finishing them in an ANOZINC bath.

It's an inexpensive anodic treatment that greatly extends the resistance of zinc coatings to outdoor exposure, aging and corrosion. Over 200 hours under A-N salt-spray tests prove that fact.

Here are other important advantages:

LOW COST because Anozinc salts are moderately priced; the operating cycle is short and standard drying procedures are used.

EASY TO HANDLE because the bath operates at room temperature; uses ordinary plating facilities; is readily maintained without frequent additions.

3 ATTRACTIVE COLORS to choose from:—Clear Anozinc retains the lustre and appearance of new zinc; Yellow Anozinc gives a brassy, slightly iridescent finish; Black Anozinc for a deep, rich black.

Wherever you want better appearance on zinc surfaces — or a better paint base — your best answer is ANOZINC. Write for further information, giving a brief outline of your application.

OTHER U.C. PRODUCTS AND PROCESSES TO SERVE YOU

CHROMIUM PLATING for wear-resisting, oil-retaining and other types of finishes.

☆**UNICHROME ALKALINE COPPER** for smooth lustrous copper plating in a non-cyanide bath.

☆**UNICHROME DIP** for increased corrosion resistance of zinc and cadmium—without electric current.

☆**UNICHROME STRIP** for speedy removal of copper, chromium, zinc, etc.

☆**UNICHROME RACK COATINGS**

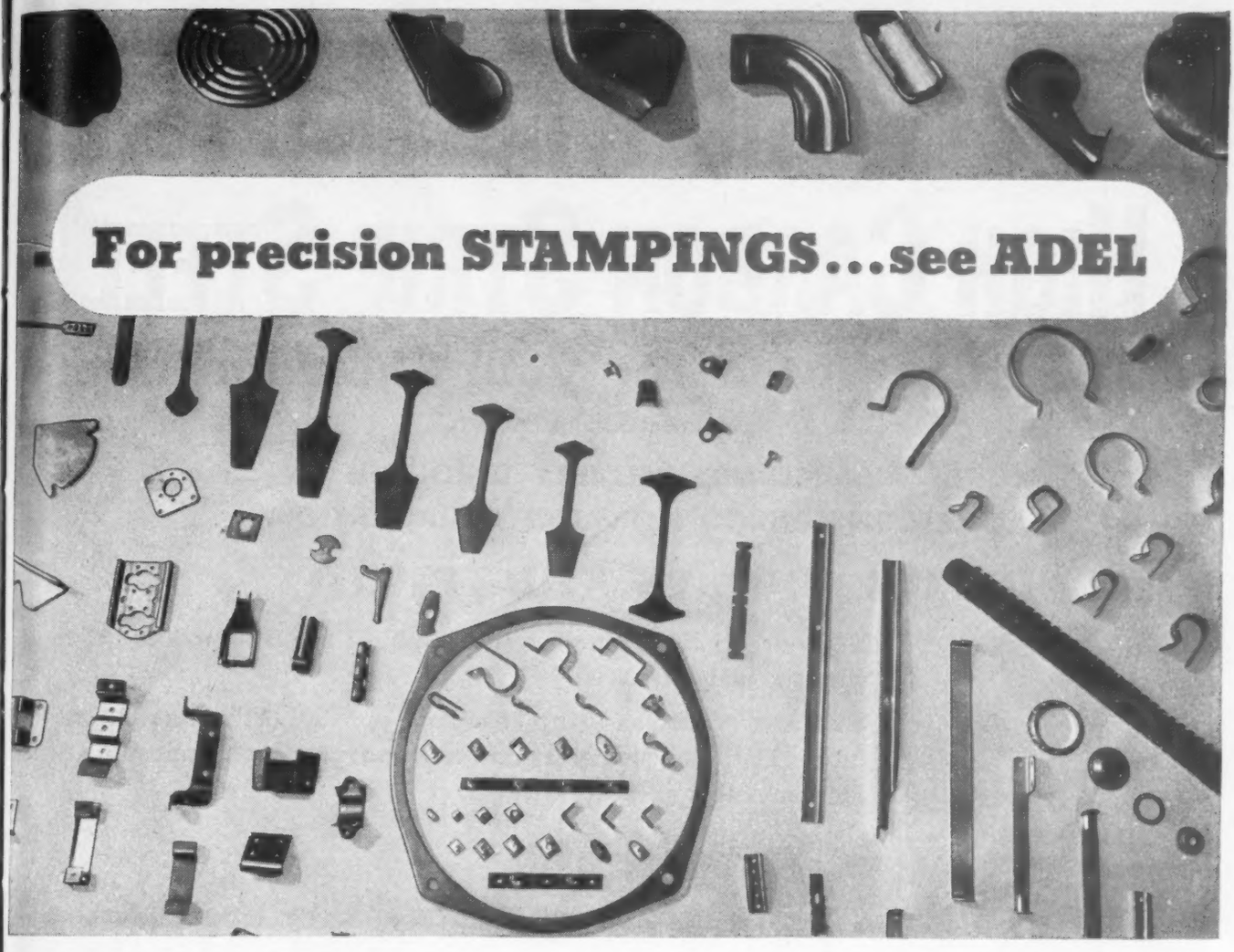
☆**UNICHROME STOP-OFF LACQUERS AND COMPOUNDS**

☆**UNICHROME Clear and pigmented LACQUERS**

☆**UCILON**—corrosion-resistant coatings for protecting surfaces against acids, alkalies, water, gasoline and various corrosive chemicals.

☆ Trade Mark U.S. Pat. Off.

UNITED CHROMIUM
INCORPORATED
51 East 42nd Street
New York 17, N. Y.
Waterbury 90, Conn. · Detroit 7, Mich.



For precision STAMPINGS...see ADEL

Just furnish the blueprints—and forget it. The job can be tooled, precision-stamped to close tolerances, heat treated, plated—and even assembled—with ADEL techniques which have been war improved to such production speed that your own product-assembly will move at a faster pace because of ADEL's all-around quick stamping service.

ADEL's batteries of punch presses (range up to 110 tons), and ribbon-forming machines have turned out over 250 million aircraft parts. Use these facilities, and ADEL *Design Simplicity* Engineering to tool, fabricate, process and assemble your parts all in one shop. ADEL plants are on either side of the country to provide speedy service to industry all over the U.S.A.

For stamping runs that are really fast, call an ADEL engineer at the office nearest you. It will be the first and only step you'll have to take to solve your stamping problems. **Write Dept. B-1**

ADEL PRECISION PRODUCTS CORP.

ADEL

Trade Mark

Burbank, Calif. • Huntington, W. Va.

Offices: **Seattle 1, Washington; Dayton 2, Ohio; Detroit 2, Michigan; Hagerstown, Maryland; Baltimore 1, Maryland; New York 20, N.Y.**
In Canada: Railway and Power Engineering Corporation, Limited

Copyright 1945 - ADEL PRECISION PRODUCTS CORP.

PRODUCTS OF *Design Simplicity* AND *Dependability*

The Aircraft and Transportation Division of ADEL manufactures precision controls for planes, boats, tanks, armament equipment. *Left:* ADEL "Mighty Midget" 4-way hydraulic selector valve. *Center:* ADEL Series "K" Fluid metering pump—outputs from .05 to 200 G.P.H. *Right:* ADEL *ISOdraulic remote control, remains syncronized from −65°F. to +160°F. *Trade Mark

MUSIC WIRE and HIGH CARBON STRIP STEEL

can be substituted for your shortage items!

(Government Surplus Property)

IMMEDIATE DELIVERY THROUGH
RECONSTRUCTION FINANCE CORPORATION

PRICED FOR USE AS SUBSTITUTES

Begin negotiations for your share in large available tonnage of music wire and strip steel.

Shortages of wire and strip steel have put mill deliveries well into the future. Both these items are now on sale at prices to permit substitution for many other grades of wire and strip.

A CONTINUING SALE

This continuing sale by Reconstruction Finance Corporation places at your disposal *new* music steel spring wire in excellent condition, and new high carbon, cold-rolled strip steel, in fair to good condition. The strip steel is in many gauges and widths, mostly in coils. The music wire is well-protected, and is available in various gauges, catchweight coils. Both classifications are priced for use as substitutes for many other grades of wire or strip. The music wire is located in Boston, New York, Philadelphia, Cleveland, Chicago, and Pacific Coast regions; the strip steel in the East and Middle West.

IT'S EASY TO BUY FROM RFC

Sales will be made direct to purchaser. Contact your nearest RFC Disposing Agency for complete information.

ASK YOUR NEAREST RFC DISPOSING AGENCY FOR INFORMATION ON AVAILABILITY OF CARBON BARS, ALLOY BARS AND TOOL STEEL

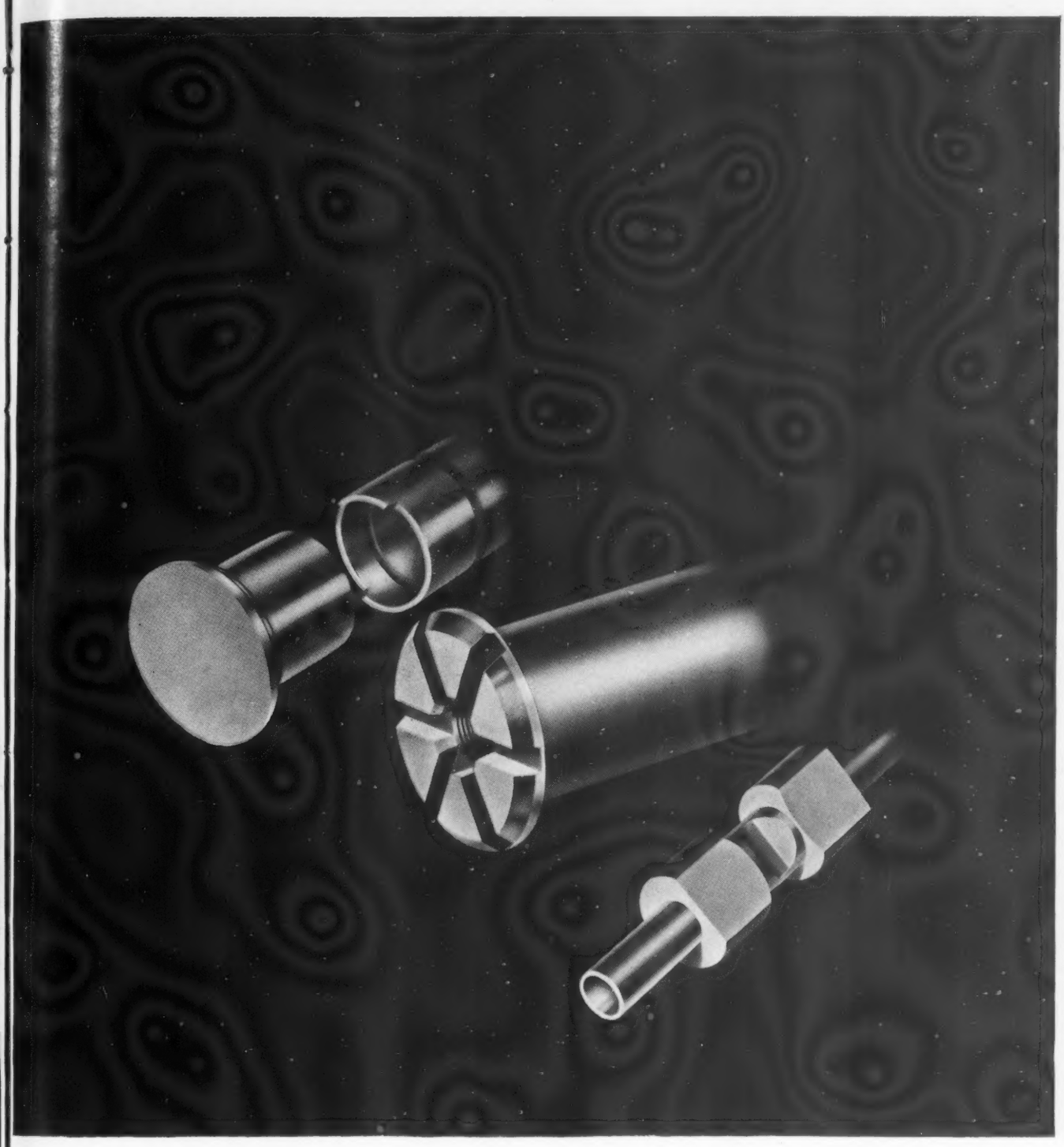
RECONSTRUCTION FINANCE CORPORATION

A DISPOSAL AGENCY DESIGNATED BY THE SURPLUS PROPERTY BOARD

Disposing Agencies at: Atlanta • Boston • Charlotte • Chicago • Cleveland • Dallas • Denver • Detroit Houston • Kansas City, Mo. • Los Angeles • Minneapolis • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle

BUY WAR BONDS

26



PORTRAIT OF PERFECTION

If it calls for precision handling, let McQUAY-NORRIS make it! Our knowledge of metals, our 35 years of experience in all phases of automotive precision-part making are the most versatile in the industry—and we love *tough* ones! Inquiries are welcome from any industry with peacetime plans.

TIME TESTED McQUAY NORRIS AUTO PARTS PROVEN IN SERVICE

FOR INGENUITY IN PRECISION ENGINEERING . . . IT'S

McQUAY-NORRIS
MANUFACTURING COMPANY
ST. LOUIS, MO. . . TORONTO, ONT.

PRECISION WORKERS IN IRON, STEEL, ALUMINUM, BRONZE, MAGNESIUM

NOW TRY for FASTER,

A.W.S. CLASSIFICATION E6020/E6030

Welds made with W-27 electrodes meet these requirements.

1. **High mechanical properties**
2. **Rigid X-ray examination**
3. **Excellent profile appearance**
4. **Excellent surface appearance**
5. **High deposition rate**

●This new, heavily covered electrode—Type W-27—is specially designed for flat and horizontal fillet welding and flat groove welding at medium to high alternating or direct currents.

Proved by extensive laboratory and field tests, which have been confirmed by shop production data, the W-27 is the most advanced heavily covered electrode available for its particular applications.

Meeting A.W.S. E6020/E6030 requirements, this new electrode's stable, forceful arc produces deep penetration and a heavy slag, which completely covers the deposit, yet is easy to remove. Welds made with W-27 are outstanding in appearance and have ample margin over requirements of A.W.S. specifications.

For applications involving flat or horizontal fillet welding or flat groove welding, and capable of being fabricated at high currents, this electrode's higher melting rate allows faster welding—increases production.

Where heat input is a critical factor, the W-27's higher melting rate allows satisfactory welding speeds at less than normal current input. The work, therefore, shows less warpage and less crack sensitivity, and there is a marked reduction in locked-up stresses in deposited weld metal.

Since only its use in actual production will prove the value of any electrode, why not ask your G-E arc-welding distributor for samples of the W-27 and let your own operators be the judges. Your distributor can also provide you with more detailed performance data. Or, write to General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC

673-56-8748

OUR NEW W-27 ELECTRODE

BETTER FLAT AND HORIZONTAL WELDING

For horizontal fillets, the W-27's rapid, steel-like fill can be spread evenly on the vertical plate, assuring weld leg size.

Its greater operating flat welding rates plus its ability to handle more current than Type W-23 permits greater weldings increases production.

RANGE OF MECHANICAL PROPERTIES

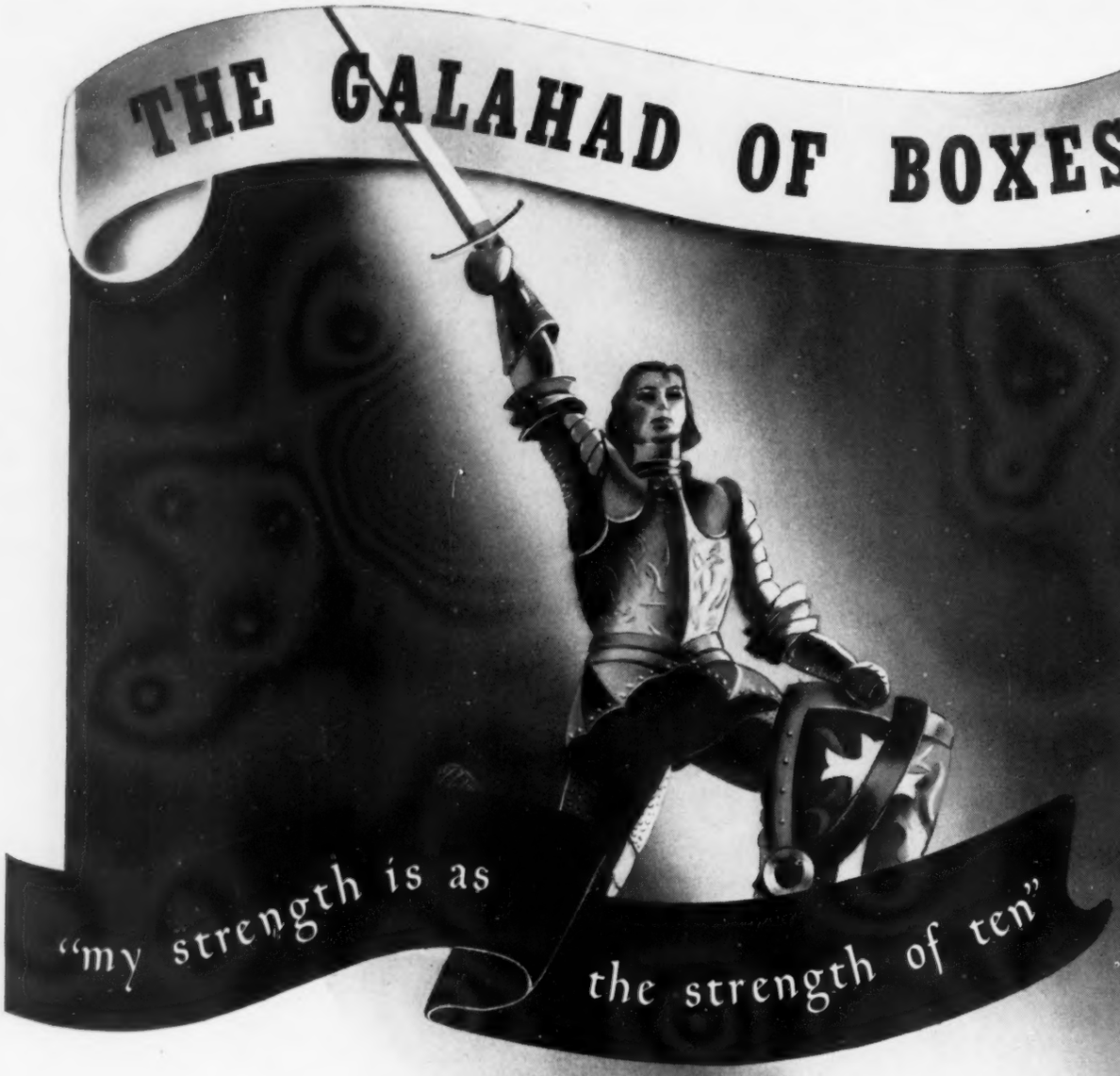
	As Welded	Stress Relieved
Tensile strength, lb per sq in...	63,000–68,000	61,000–65,000
Yield strength, lb per sq in....	53,000–57,000	47,000–52,000
Per cent elong. 2 in.....	27.0–32.0	32.0–38.0
Per cent reduction of area.....	54.0–62.0	60.0–66.0

Impact resistance ft-lb Izod	50–70
Endurance limit, lb per sq in.	30,000–34,000
Density, grams per cu cm	7.83–7.86
Brinell hardness	150–170

ARC WELDING ELECTRODES and EQUIPMENT

Buy all the BONDS you can
— and keep all you buy

THE GALAHAD OF BOXES



The first essential of your shipping container is strength—strength of design and strength of construction to guarantee maximum protection for your product at all times.

SUPERSTRONG Boxes and Crates—"Bound With Steel"—are tough, sturdy wirebounds built for strength. They have been tested and found worthy under the most trying conditions of war and peace.

For strength as well as for economy—it's SUPERSTRONG!

SHIPPING TRADE SUPERSTRONG MADE CONTAINERS

RATHBORNE, HAIR AND RIDGWAY COMPANY

1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS

THIS MATERIAL COMES WITH FOUR DIFFERENT KINDS OF RESISTANCE

It's Steel from the Republic Flat Rolled Line —made to resist heat, cold, rust, abrasion

Those are only a few of the characteristics of Steel that give Republic Flat Rolled Products the versatility to meet an exceptionally wide range of product and manufacturing needs.

The Republic Line gives you one source for flat rolled steel in *all analyses,* from plain carbon to stainless steel—*in all forms,* from narrow strip to 90-inch-wide sheets—*in all commercial finishes.* Whether your product requires corrosion-resistance or electrical properties—is deep drawn—must take a porcelain finish—or demands other special qualities, the material you want will be found in the Republic Flat Rolled Line.

Republic products fabricate easily and quickly by almost *any* method. They come flat or in coils, whichever is best for your production setup.

The vast research and engineering experience of a front rank steel producer, combined with the integrated control of a single organization, is your assurance of quality in Republic Flat Rolled Products.

For production or maintenance, you can get the materials you want for better performance and lower costs, if you choose from the Republic Flat Rolled Line.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Bldg., New York 17, N. Y.

Trade Names to Remember

TONCAN IRON
(resists rust and corrosion)

ENDURO STAINLESS STEEL
(corrosion- and heat-resisting)

ALDECOR — COR-TEN
REPUBLIC DOUBLE STRENGTH
(weight-saving, high strength steels)

TONCAN ENAMELING IRON
(easy to fabricate and enamel)

ELECTRO PAINTLOK
ELECTRO ZINCBOND
ELECTRO NEVAPEEL
(take paint readily—hold it)

TAYLOR ROOFING TERNES
(proved by 134 years' use)

REPUBLIC SILICON STEEL
(high-performance electrical steel)

EX-L-ITE TIN PLATE
(uniform high quality)

Republic

FLAT ROLLED PRODUCTS

SHEETS: Hot and cold rolled—carbon, copper-bearing, alloy and stainless steel—Toncan Iron—electrical, enameling, culvert, galvanized, galvannealed, electro plated, roofing, ternes, oven lining, bonderized. ● **STRIP:** Hot and cold rolled—coils and cut lengths—electrical, carbon, alloy and stainless steel—Toncan Iron. ● **PLATES:** Universal, mill edge, sheared—carbon, alloy and stainless steel—Toncan Iron—light armor. ● **TIN PLATE:** Coke and electrolytic—black plate and bonderized black plate—lacquered and coated in solid colors.

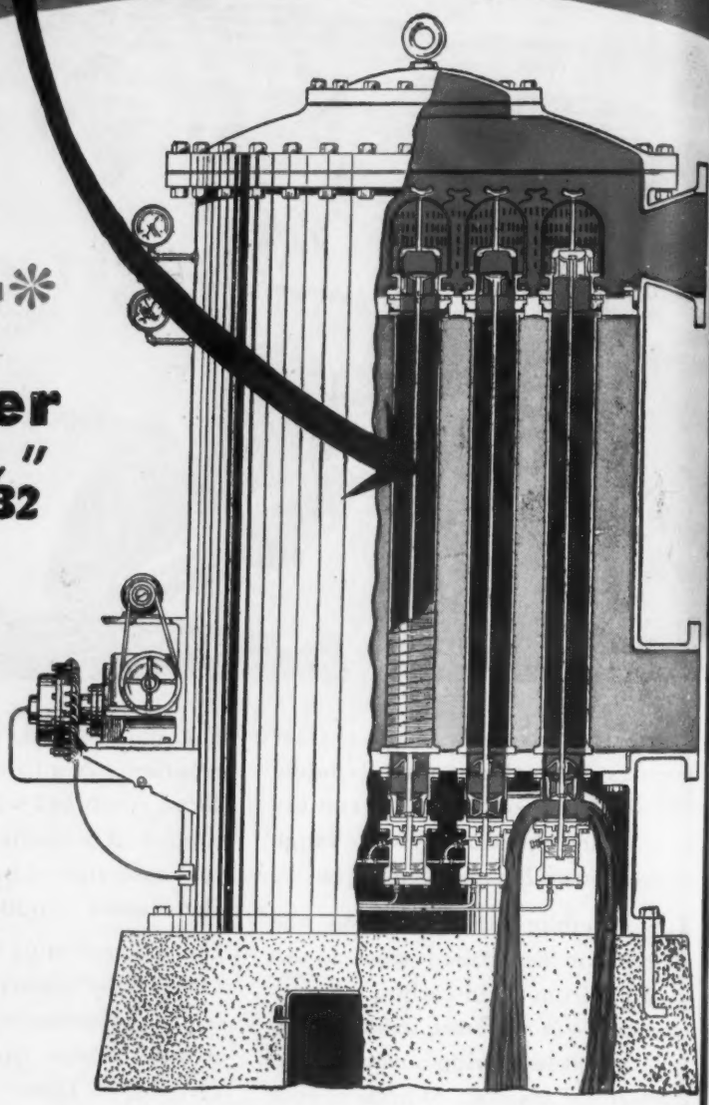
ADAMS AUTOMATIC WATER FILTERS

Remove GRIT and DIRT* from River Water

*15 times finer than 1/32"

Adams *Poro-Screen* Filters offer a practical answer to large-scale filtration of dirty river water for use in hydraulic equipment. Designed for continuous, automatic operation and requiring a minimum of attention, Adams Automatic Filters supply the required volume of clean water for your operations—water free of dirt and grit which damage bearings, rolls, valves and other equipment. Highly successful on water cooling installations of open-hearth and heat-treating furnaces.

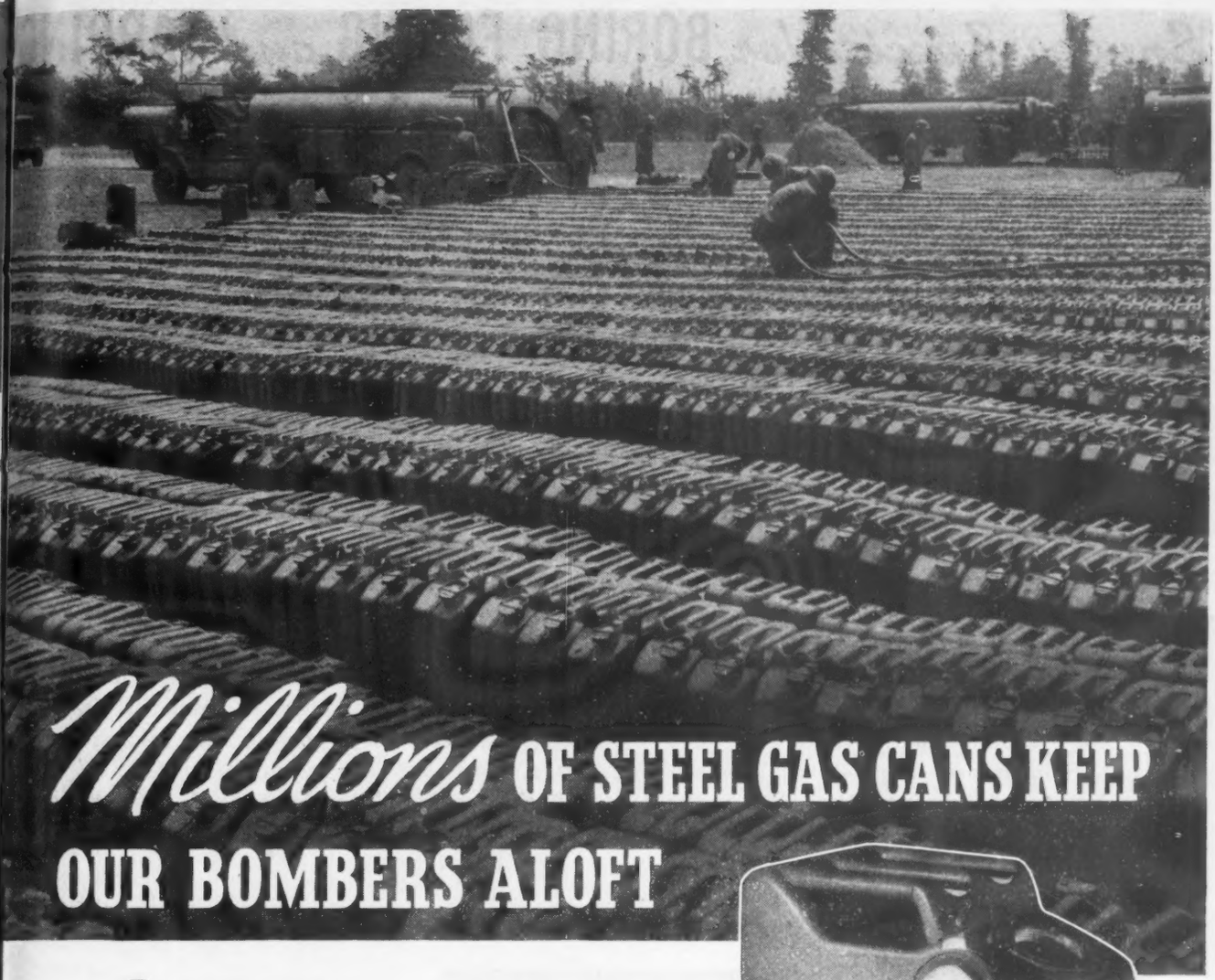
Adams Automatic Filters provide low velocity filtration. Their multiple tube design has no moving clearances, is fully automatic. One tube is back washed at a time while filter is delivering full rated capacity. Adjustable control gives flexibility of back-washing—excessively dirty water more frequently, normal water less frequently. Built in four sizes from 300 gpm. to 2000 gpm. Write for Bulletin 901.



★ R. P. ADAMS COMPANY, INC. ★

75 CHICAGO STREET, BUFFALO, N. Y.

ADAMS PORO-STONE AND PORO SCREEN FILTERS



Millions OF STEEL GAS CANS KEEP OUR BOMBERS ALOFT

ANOTHER of Germany's secret weapons has backfired, to speed up their own inevitable destruction. This is the "Jerri-can", or "Blitz Can"--an oblong, flat-sided, five-gallon, steel can for transporting gasoline. It is very strong and stacks or packs in small space.

America has made millions of these cans. For their manufacture, Youngstown has supplied literally miles of sheet steel with unusual deep drawing qualities. "Jerri-cans" full of gas were among the first supplies landed on D-Day in Normandy. They kept our tanks and trucks going in the sweep across France. Today they help keep our thousands of bombers and fighter planes aloft. American-made "Blitz Cans" are used in Italy, in India, Burma and China, and throughout the Pacific.

With overwhelming superiority in steel production, America and her allies can and will outbuild and outdo the Axis, on this small item or any other instrument of war. This superiority can win for us. How soon depends on how effectively we can and will bring superiority to bear on the goal of Military Victory. Then reconversion of steel to its constructive task of making the world a better place in which to live!

YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

YOUNGSTOWN 1, OHIO

Manufacturers of

CARBON · ALLOY AND YOLOY STEELS

Pipe and Tubular Products · Sheets · Plates · Conduit · Bars · Coke Tin Plate · Electrolytic Tin Plate · Rods · Wire · Nails · Tie Plates and Spikes

Snyder Special for BORING, FACING *and* TAPPING
Heavy-Duty Valves for Oil Fields

Machining valves to handle the oil that keeps our war machine running was slow and costly by conventional methods and called for skilled help which was hard to get. For one particular manufacturer of these heavy-duty valves, this Snyder special-purpose boring, facing and tapping machine solved these problems effectively.

Boring and facing is done with a four speed, single spindle head which is driven and advanced into the work by a Snyder self-contained hydraulic guide bar unit.

To the left of the operator and in front of one of the two boring units is installed a lead screw tapping device which has also a variable tool spindle speed. The entire tapping unit is mounted on a guide bar slide for hydraulic rapid advance.

Spindles are equipped with a breech lock and special tapered holes to make the exchange of tools quick and easy.

The index table is mounted on a manually operated elevating mechanism which compensates for the various sizes of work and also brings the tools concentric with the boss on the work-piece. This table is indexed for 180° with an intermediate index for the tapping operation.

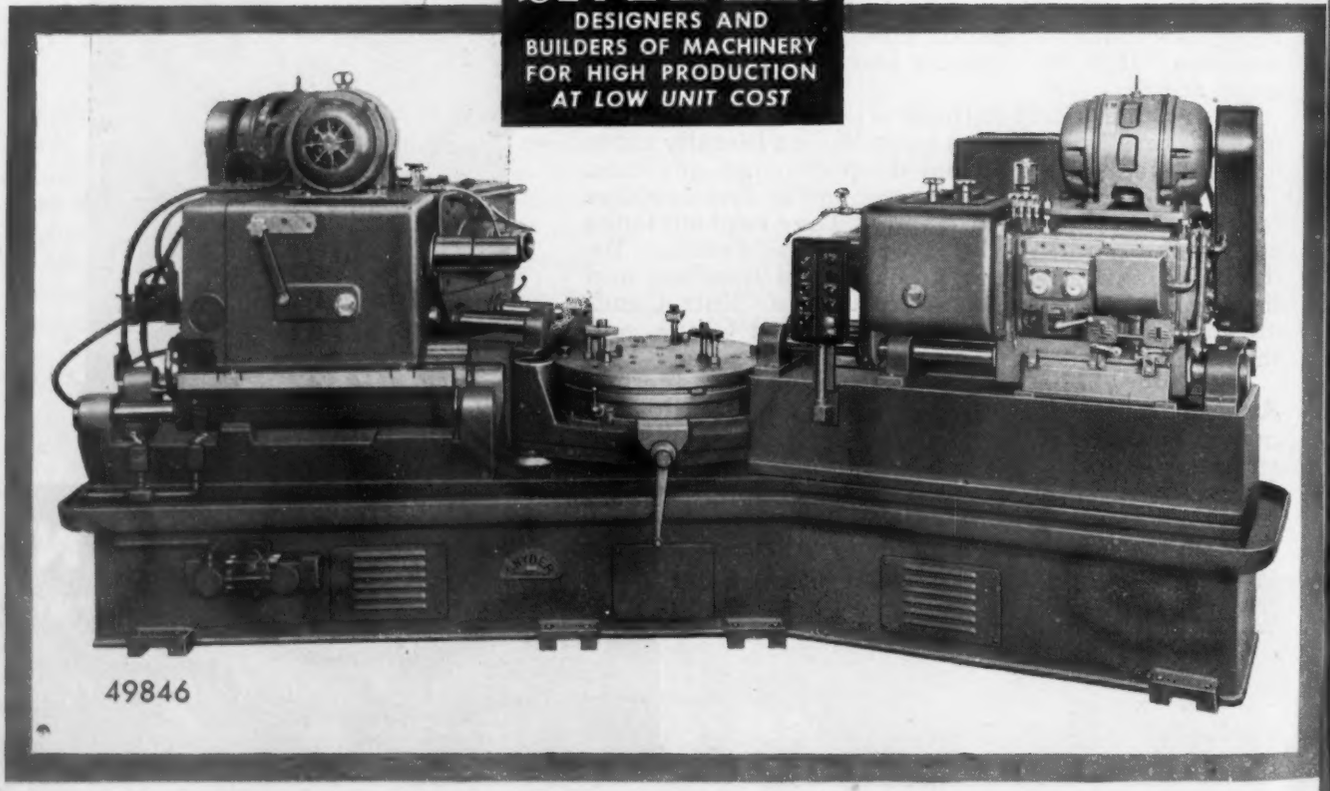
Although production in terms of units is relatively low, the savings accomplished by such machines are substantial. These savings affect time, handling, operator fatigue, operating skill, quality and uniformity of finish. Similar savings can be accomplished in the machining of other types of large, heavy parts.

If you are looking for ways to reduce the cost of any metal cutting operation it is likely that our experience as specialists in that field can be of considerable value to you. We invite your inquiries. *Snyder Tool & Engineering Company, 3400 E. Lafayette Avenue, Detroit 7, Michigan.*

20 Years of Successful Co-operation with Leading American Industries

SNYDER

DESIGNERS AND BUILDERS OF MACHINERY FOR HIGH PRODUCTION AT LOW UNIT COST



49846

2 TO 5 TIMES LOWER GRINDING COSTS

GRINDING "MAGIC" FOR CARBIDE-TIPPED TOOLS AND DIES

You can now precision grind carbide-tipped tools and dies amazingly faster, cheaper with Por-os-way—without burning, without discoloring. Get the Por-os-way wheel with *green* silicon carbide, the wonder grit that's back from war. Try Por-os-way once and you'll use it always!

GROW with America! We can all earn more, buy more, have more after the war if labor, business and government are progressive, fair and cooperative.

RT. M. Reg. U. S. Pat. Off.

IN SHOP after shop you hear enthused machinists passing along the good word about Por-os-way, the sensational *open structure* precision grinding wheel that cuts hardest metals deeper, faster, *cooler*.

Men at the machines *ask* for Por-os-way.

They know how it rough grinds *and* precision finishes...with astounding speed...fewer rejects...and longer life. They know its amazing three-year war record first hand, and they've shared in its success.

When *you* ask for Por-os-way and put it to work you'll cut grinding costs 2 to 5 times, help keep war production up and make the boss happy. For *proof* of Por-os-way's results call in a Por-os-way engineer. He and Por-os-way will open your eyes to new feats in grinding! A. P. de Sanno & Son, Inc., 436 Wheatland Street, Phoenixville, Pa., Since 1893.

← LOOK AT THE DIFFERENCE!

Your eye tells you at a glance why Por-os-way is *different*. See the *extra porosity* that gives you over 8 distinct operating advantages!

RADIAC*

POR-OS-WAY*

The Precision Grinding Wheel

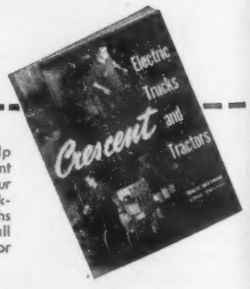
POR-OS-WAY SEGMENTAL SURFACE GRINDING MEANS NO MOAN, NO GROAN, NO GRUNT! Give your surface and face grinding a BIG boost with Por-os-way segments. See how they cut faster, dig deeper... do it quietly by *cutting* the metal, not "scraping" the surface. No fuss, no racket and less time out for wheel dressing, too!

The Wheel That Costs The Most At First....Costs The Least At Last

THE Crescent NCRE, shown above saving time and manpower for The Trailmobile Company, Cincinnati, O., is the most flexible of all lift trucks. The NCRE can be used for lifting, tiering or trailing. Equipped with a 62″ lift, it will operate inside any standard boxcar. Available in 4000-lb. and 6000-lb. lifting capacities.

Crescent *Electric* Trucks increase the speed of material handling and at the same time reduce labor costs because they effect drastic manpower savings. Careful designing and superior construction are responsible for their ability to withstand the hard usage they get these busy wartime days. Maintenance costs are negligible. Crescentize your plant and watch those handling headaches fade.

CRESCENT TRUCK COMPANY **1100 Willow St., Lebanon, Pa.**



FREE CATALOG to help you select the right Crescent *Electric* Trucks for your plant is yours for the asking. It includes photographs and specifications for all current models. Send for your copy today.

Crescent ELECTRIC TRUCKS AND TRACTORS

Industrial Truck and Tractor Specialists Since 1917

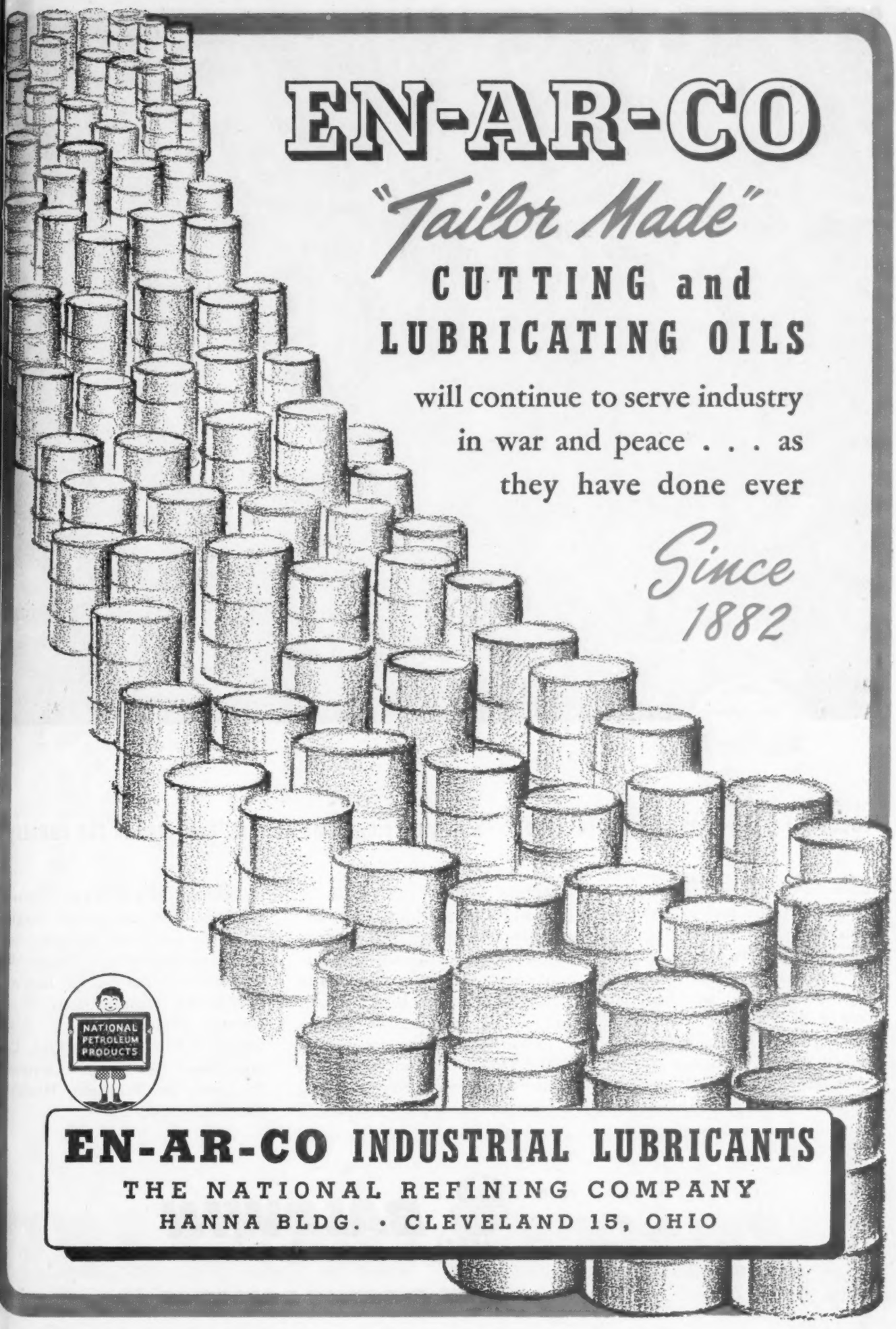
EN-AR-CO

"Tailor Made"

CUTTING and LUBRICATING OILS

will continue to serve industry in war and peace . . . as they have done ever

Since 1882

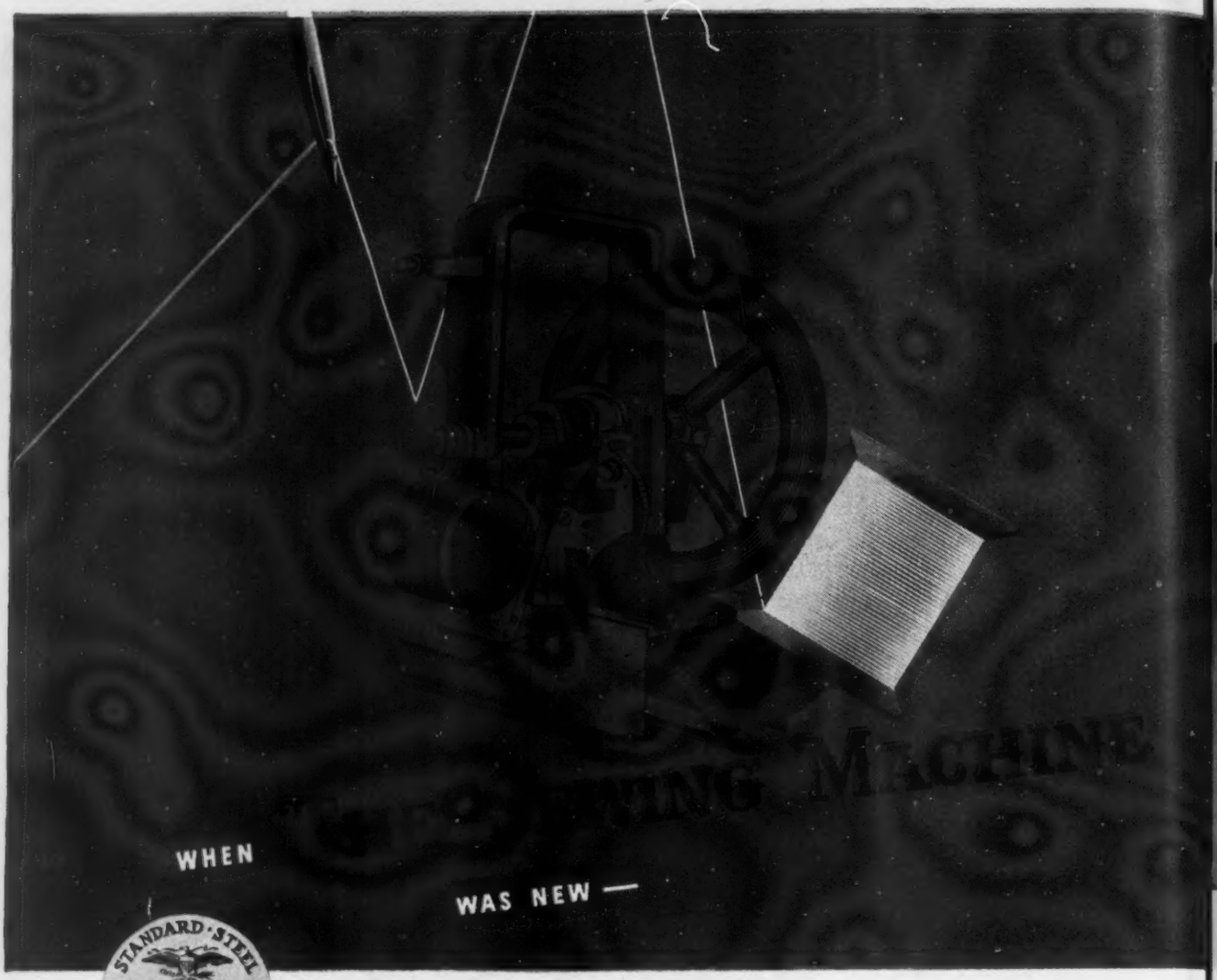


NATIONAL PETROLEUM PRODUCTS

EN-AR-CO INDUSTRIAL LUBRICANTS

THE NATIONAL REFINING COMPANY

HANNA BLDG. · CLEVELAND 15, OHIO



Freedom Forge—now "Standard Steel"—was producing some of the "Best iron in the country"

This ancestor of today's sewing machine was invented back in 1850, and seems like an "old" development. Yet when it was new, Freedom Forge had already been an important iron supplier for 55 years and was producing some of the best wrought iron in the country, accepted as being equal to the best Swedish or Russian product.

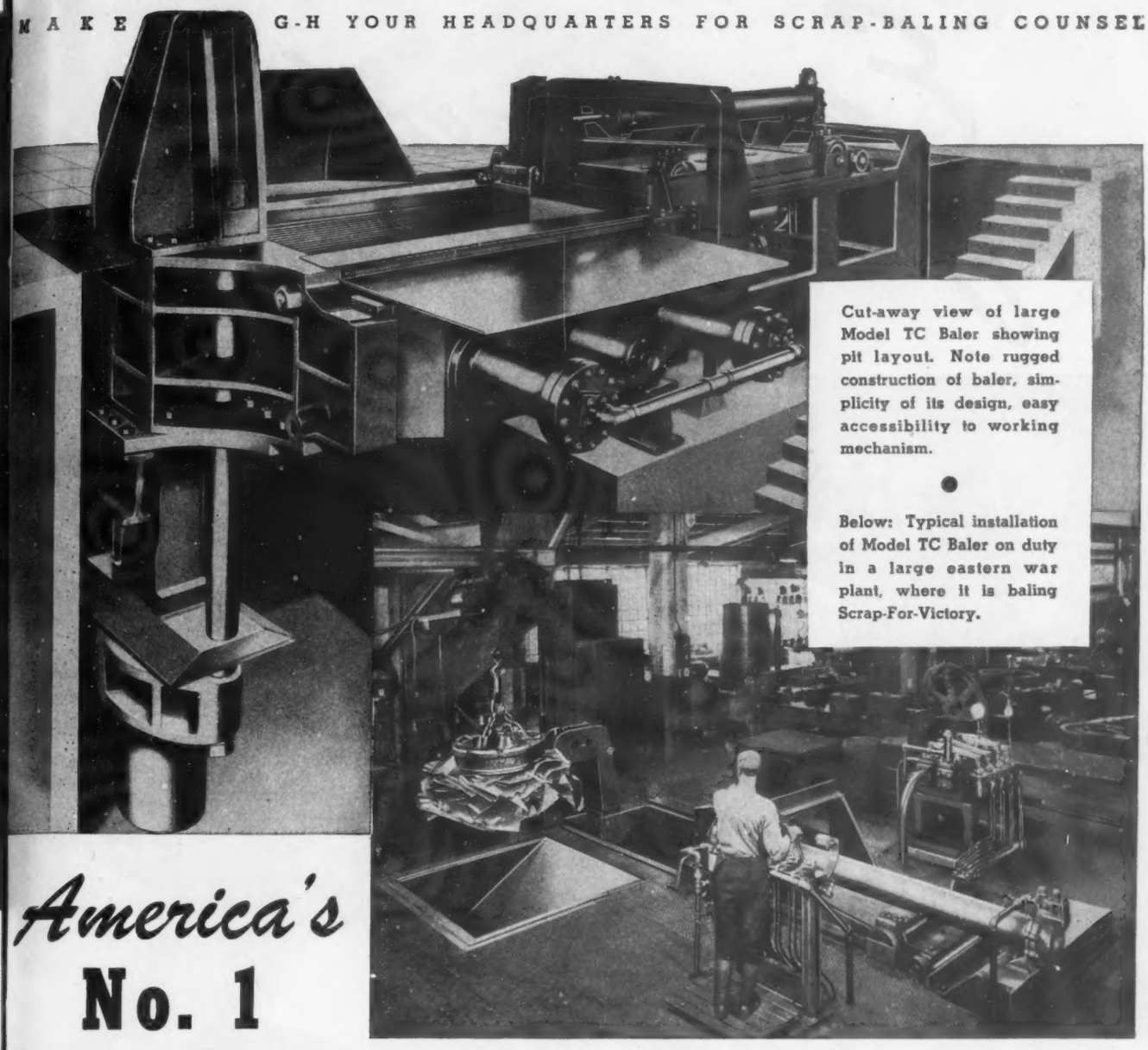
The cold-blast furnaces used 205 bushels of charcoal per ton of iron, and refinement required 125 bushels of charcoal per ton of blooms. The charcoal was obtained from countless acres of forest, spread over adjoining mountain ranges. Metal was worked with 1,500-pound wooden helve hammers and four-ton cast iron helve hammers . . . advanced equipment for the day.

The 150-years of know-how that started with Freedom Forge is serving industry at the original location, in the Standard Steel Works at Burnham. Whatever your casting and forging needs, the best short-cut toward permanent satisfaction is to "Standardize on Standard." The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U. S. A. Offices: Philadelphia, New York, Chicago, Boston, Washington, Cleveland, St. Louis, San Francisco, Houston, Detroit, Pittsburgh.

BALDWIN

STEEL FORGINGS & CASTINGS

MAKE G-H YOUR HEADQUARTERS FOR SCRAP-BALING COUNSEL



Cut-away view of large Model TC Baler showing pit layout. Note rugged construction of baler, simplicity of its design, easy accessibility to working mechanism.

Below: Typical installation of Model TC Baler on duty in a large eastern war plant, where it is baling Scrap-For-Victory.

America's No. 1 BALER!

FOR METAL WORKING PLANTS, SHEET MILLS, SCRAP YARDS

The G-H Model TC Hydraulic Triple Compression Baler is especially designed for efficient, high volume baling of bulky sheet scrap such as large industrial stampings and clippings, sheet mill trimmings, old auto bodies, fenders, drums and scrap wire. Because of its exclusive baling cycle, it compresses bulky scrap speedily without preliminary cutting or preparation . . . produces compact, high density, mill-sized bales at extremely low cost.

For further information on this powerful, skillfully engineered baling press, write for Bulletin 86-TC.

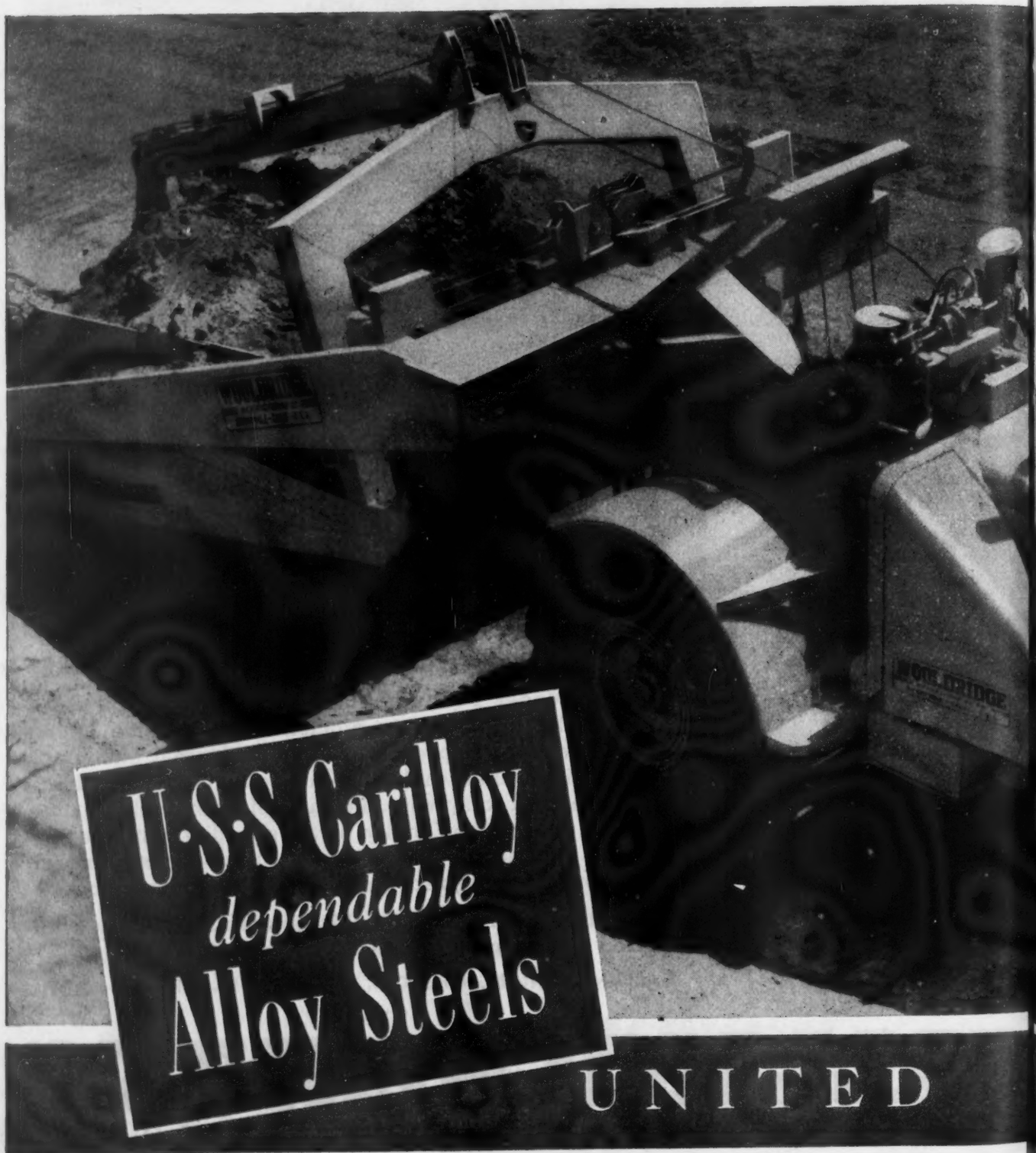
GALLAND-HENNING MFG. CO., 2747 S. 31st St., Milwaukee 7, Wis.

GALLAND-HENNING

SCRAP METAL BALING PRESSES

A 4611-1P-

Engineered for performance



U·S·S Carilloy
dependable
Alloy Steels

UNITED

VITAL PARTS THAT MUST STAND THE MOST GRIEF ARE MADE OF SPECIAL PURPOSE U·S·S CARILLOY ALLOY STEELS

CAPABLE of carrying full capacity loads of 18 cu. yds. at speeds up to 20 m.p.h., this recently developed, self-propelled, heavy duty scraper has been built to meet tomorrow's high-speed, low-cost earth-moving requirements.

Every part has been designed for maximum efficiency and for lowest cost performance.

For that reason, axles are made of U·S·S Carilloy Alloy Heat-treated Steel, side rail scrapers are of special U·S·S Abrasion Resisting Steel.

• • •

Wherever it is necessary to insure strength and safety, to provide superior resistance to shock and impact, to decrease weight, conserve space or to reduce maintenance, U·S·S Carilloy Alloy Steels are available to facilitate sound, economic engineering design.

U·S·S Carilloy Alloy Steels include Bearing Steels, Aircraft and Gun Quality Steels, Heat Resisting Steels, AISI, NE and Special Analysis Steels, as well as Nitralloy Steels, in all grades, in all finishes and in the widest range of sizes—produced either by Electric Furnace or Open-Hearth process.

Our unsurpassed facilities for on-the-spot rolling, finishing and heat treating permit us to furnish alloy blooms, billets and bars, slabs, plates, sheet and strip, as well as standard and special sections. Wide flexibility in furnace capacity makes it possible to handle, promptly, small orders as well as large.

U·S·S Carilloy Alloy Steels are produced by specialists who make fine alloy steels and nothing else—and whose aim is to give you the exact grade of steel that will do the best job for you at lowest cost. We welcome the opportunity to work with you.

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

USS STEEL — UNITED STATES STEEL

STATES STEEL

NOW'S THE TIME FOR *Your* BIG "MOP-UP"!

RE-SOLICITATION is the keynote for a victorious "mop up" in the Mighty 7th War Loan. Bond rallies plus continuous competition between departments help to keep Bond subscriptions on a quota-topping climb. Strategic poster displays . . . showings of "Mr. & Mrs. America," the Treasury film . . . distribution of the War Finance Booklet, "How To Get There," and the handy Bond-holding envelopes play an important part. But, above all else, arrange to have every employee asked *once more*—and personally urged *once more*—to meet his personal quota in the Mighty 7th!

The Payroll Savings Plan is the mainstay of every War Loan—meeting your plant quota is vital to the success of the 7th! Remember we have to make two drives in 1945 do the work of three last year. Put on an intensive "mop up" final to help mop up the Japs, cut the tentacles of inflation—and lay the foundation of security.

The Treasury Department acknowledges with appreciation the publication of this message by

STEEL

★ *This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council* ★

Where Freight Cars Are Built —PLYMOUTH'S THE CHOICE

Men who know railroading pick Plymouth for the tough jobs, like this one at the Butler, Pennsylvania plant of the Pullman-Standard Car Manufacturing Company. Working on a 54-hour a week schedule, this 12-ton, 100 h.p. gasoline-powered Plymouth switches cars from one department to another and moves loaded cars and empties in and out of the plant yards.

It's a hard grind, but a Plymouth can stand the strain of constant starting, stopping and switching. This one, for example, has a girder beam and bar sides frame, steel cast bumpers, straight air brakes and full-size, automatic couplers at front and rear. It's compact and maneuverable, but it's built to do the big jobs well.

Power and stamina, built into every Plymouth Locomotive, keeps them on the job, day after day. If you're looking for dependable, economical intraplant transportation, you'll want to know more about Plymouth.

TRACK HAULAGE IS CHEAPER HAULAGE

PLYMOUTH LOCOMOTIVES

GASOLINE, DIESEL, AND DIESEL ELECTRIC

PLYMOUTH LOCOMOTIVE WORKS • Division of The Fate-Root-Heath Co., Plymouth, Ohio, U.S.A.

THE WRIGHT LINE

HAS A WHOLE *Flock* OF ADVANTAGES!

● Every hoist, every trolley, every crane in the **WRIGHT** line has distinctive advantages for specific jobs. Indeed there are a whole flock of **WRIGHT** advantages, such as

1—Special analysis steel chain, electrically butt welded, heat-treated and proof-tested. Will not work harden.
2—Each link is gauged to fit pocket wheel. The chain is exceptionally high in tensile strength.
3—Non-fouling chain guide permits pulling of hand chain from any angle below hoist.
4—Planetary gear reduction of efficient and compact design.
5—Drop forged bottom hook from special analysis steel gives visible warning when overloaded through slowly opening without fracture, thus providing safe operation.
6—Precision ball bearings to increase efficiency and ease of operation.

Another **WRIGHT** advantage is engineering based on three principles: Safety, Efficiency and Economy. See your local **WRIGHT** distributor.

ARMY E NAVY

ACCO

York, Pa., Chicago, Denver, Los Angeles, San Francisco, Portland, New York, Bridgeport, Conn.

WRIGHT MANUFACTURING DIVISION
AMERICAN CHAIN & CABLE

ACCO TRADE MARK

In Business for Your Safety

You use high carbon heat treated
cap screws for a reason — extra strength.
CLEVELAND Top Quality 1035's
give you another extra — unusual
toughness added by the Kaufman
Process of manufacture.

CLEVELAND *Top Quality* **FASTENERS**

The Cleveland Cap Screw Company

2917 EAST 79TH STREET • CLEVELAND 4, OHIO

Warehouses: Chicago, Philadelphia, New York, Los Angeles

Ask your Jobber for Cleveland Fasteners

MADE BY THE ORIGINATORS OF THE KAUFMAN PROCESS FOR GREATER STRENGTH AND ACCURACY

FERRY CAP
★ PIONEERING ★

The First Company to Produce Cold Upset Connecting Rod Bolts

Diesel Freight Locomotive for the Burlington Lines.

Subjected to terrific punishment . . .
FERRY CAP connecting rod bolts are one of the most vital parts of this modern Diesel Locomotive

MADE of nickel alloy steel, threads rolled or cut, and finished to extremely close thread and body tolerances—body ground where specified—these bolts are noteworthy for their strength, toughness, and precision—in brief, for their performance.

Ferry Cap—recognized pioneers in cold upset connecting rod bolts for American industry—was the first company to produce nickel alloy steel cold upset connecting rod bolts—the first to turn out rolled thread connecting rod bolts 15% to 20% stronger than threaded by other known methods.

Millions of Ferry Cap connecting rod bolts were used daily before and during World War I, and are used daily in the leading diesel, marine, jeep, truck, and tractor motors of the country in World War II.

The same skilled workmen who produce these outstanding connecting rod bolts produce SHINYHEADS—America's Best Looking Cap Screw—SHINYTHREADS—America's Leading Aircraft Engine Studs—and other Ferry Cap products. We shall welcome the opportunity to discuss your requirements with you.

The FERRY CAP & SET SCREW Co.

2159 SCRANTON ROAD • • • • • CLEVELAND 13, OHIO

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

CAP AND SET SCREWS • CONNECTING ROD BOLTS • MAIN BEARING BOLTS • SPRING BOLTS AND SHACKLE BOLTS • HARDENED AND GROUND BOLTS • SPECIAL ALLOY STEEL SCREWS • VALVE TAPPET ADJUSTING SCREWS • AIRCRAFT ENGINE STUDS • ALLOY STEEL AND COMMERCIAL STUDS • FERRY PATENTED ACORN NUTS

PAUL PUTS SPEED AND ACCURACY INTO YOUR PRODUCTION

ARMY E NAVY

6 plants of Blaw-Knox Company have been awarded the Army-Navy "E" for excellence

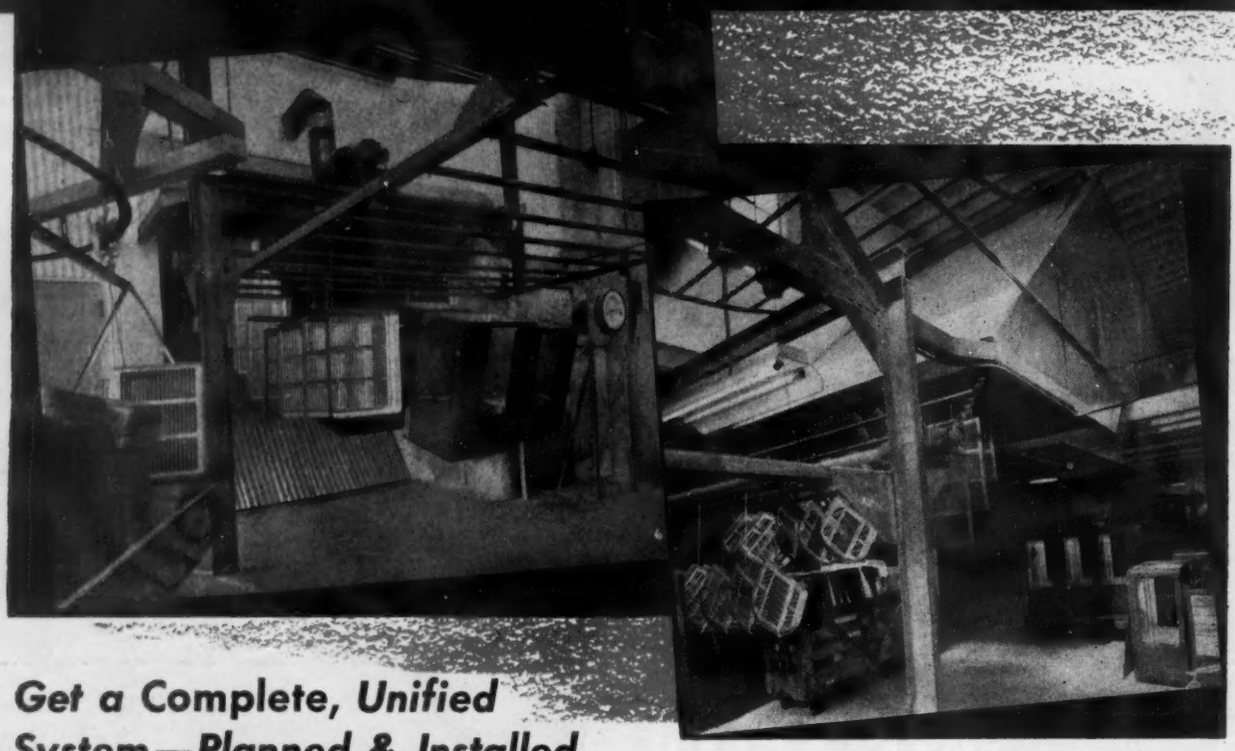
Like most of the top-notch machinists here, Paul Applegarth served his apprenticeship in the Lewis shops. His eighteen years experience in this specialized profession qualifies him as a past master at roll grinding . . . Just one of the factors responsible for the quality and reputation of Lewis Rolls.

Paul's second interest is the letters from his son, Don, now with the Army Air Corps in India.

LEWIS FOUNDRY & MACHINE . . . Division of BLAW-KNOX Company, Pittsburgh, Pa.

LEWIS ROLLS

How to Avoid Finishing Bottlenecks Through DESPATCH ENGINEERING



Get a Complete, Unified System—Planned & Installed Under ONE Responsibility!

Why not be *sure* of finishing results by having experienced engineering specialists supply your *complete** system under ONE responsibility? This is the valuable service offered by DESPATCH Engineers.

You're protected against costly bottlenecks caused by inexperienced coordination of various finishing system elements. And you are assured of correct equipment, properly planned and installed to give you *all* the results you want.

*Or separate items.

ASK FOR A DESPATCH ENGINEER to survey your plant and plan the Finishing System you need. No obligation. *Send inquiries to:*

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Despatch Oven Co.
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Take advantage of this
Complete
ENGINEERING SERVICE

Despatch engineering specialists will plan, select, coordinate and install in your finishing department such items as:

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DRYERS • CONVEYORS
WASHERS
AIR CONDITIONERS
SPRAY BOOTHS
and allied equipment

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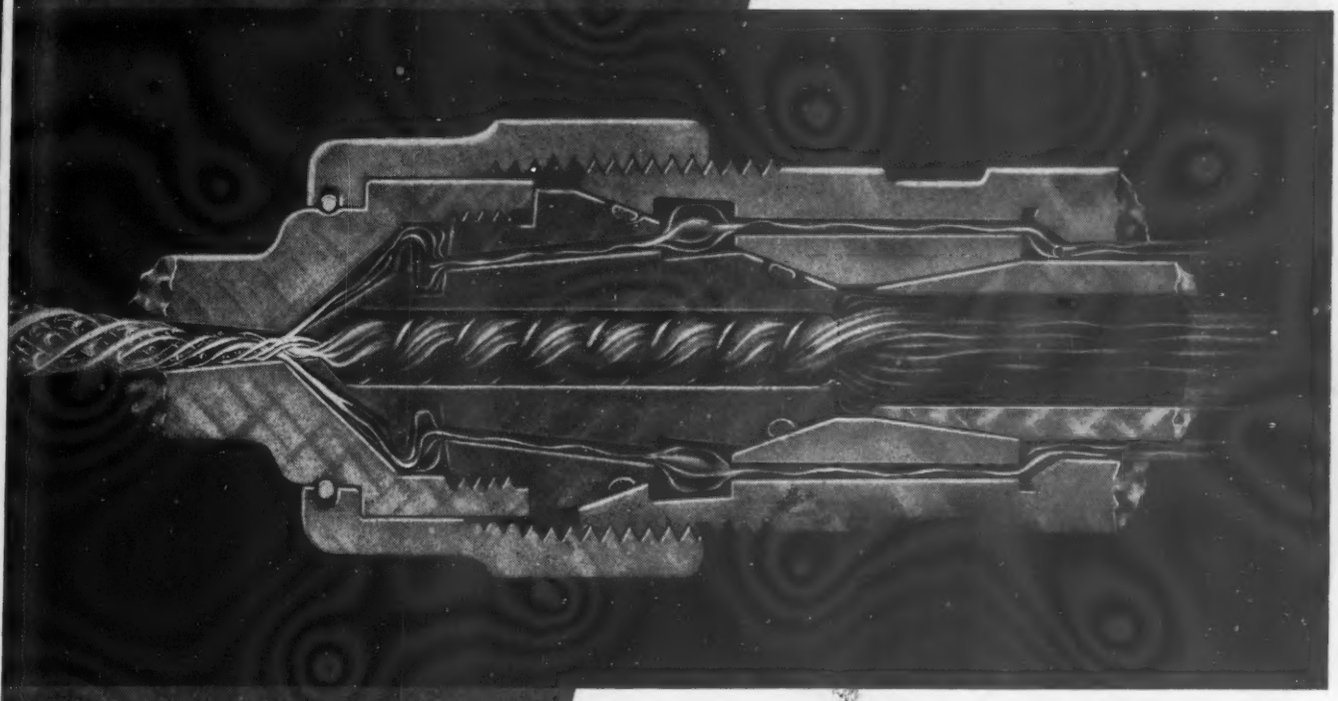
DESPATCH
OVEN COMPANY MINNEAPOLIS 14 MINNESOTA, U.S.A.

NO...This is not a robot bomb!



BUT IT SAVES YOU TIME AND MONEY!

Here is the most scientifically designed gas mixing device; incorporated into every VICTOR welding torch nozzle. Both oxygen and acetylene molecules are here thoroughly mixed; it controls ideal exit velocities. In short, it is the real reason why VICTOR welding or cutting torches are so free from annoying popping and back-firing—produce such ideal flame characteristics—stay on the job longer.

The VICTOR spiral mixer has made VICTOR torches the most economical to own and to operate.

VICTOR

ARMY E NAVY

VICTOR EQUIPMENT COMPANY

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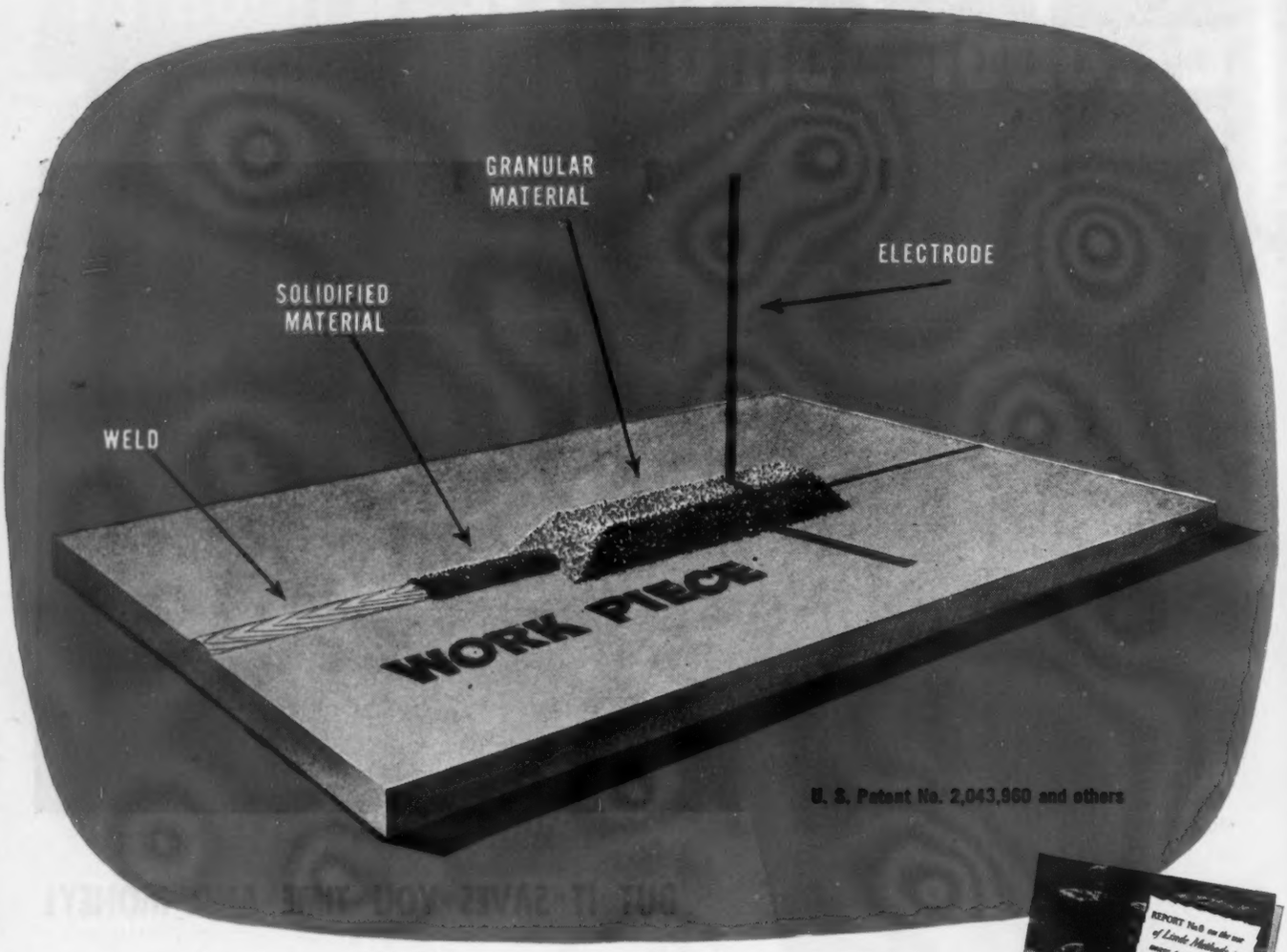
AD 112 DISTRIBUTORS FROM COAST TO COAST

THIS IS UNIONMELT WELDING



UNIONMELT Welding is easy to recognize. It is electric welding done as diagrammed above—and it makes top quality welds at speeds that are greater than with any other similarly applicable process!

UNIONMELT Welding, a process of welding electrically beneath a mineral melt, has received wide application since U. S. Patent No. 2,043,960 was issued. It is the electric welding process that is rated by many as one of the most important factors in the great wartime fabrication of steel.

Anyone may obtain a license to use UNIONMELT Welding through its developers—The Linde Air Products Company.

Linde can supply a wide variety of equipment and materials to apply UNIONMELT Welding. Linde representatives can help you determine where you can use the UNIONMELT process advantageously and what type of equipment is best suited to your work.

UNIONMELT Welding—Linde's Automatic Electric Process Joins Metals Up To 20 Times Faster Than Other Methods Of Welding With Rod . . .

For additional information send for the folder "Report No. 6 on the Use of Linde Methods in Mass Production."

MARITIME "M" AWARD FOR OUTSTANDING PRODUCTION ACHIEVEMENT

THE LINDE AIR PRODUCTS COMPANY

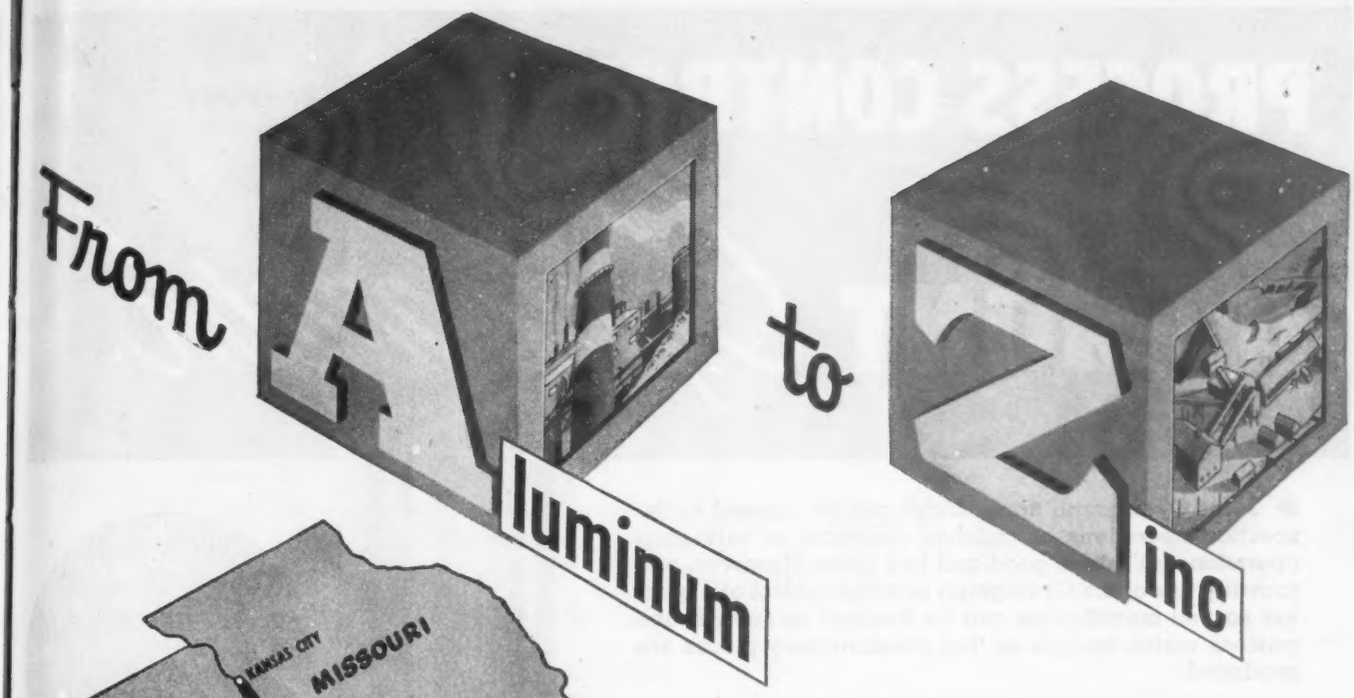
Unit of Union Carbide and Carbon Corporation

30 E. 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities

In Canada: Dominion Oxygen Company, Limited, Toronto

The word "Unionmelt" is a registered trade-mark of The Linde Air Products Company.

★ BUY UNITED STATES WAR BONDS AND STAMPS ★



YOUR INQUIRY STRICTLY CONFIDENTIAL

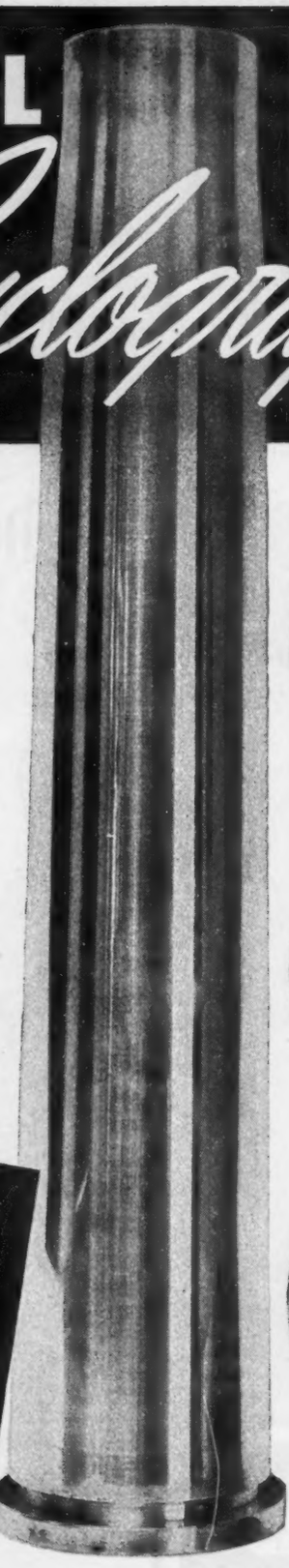
Address F. T. Ridley, Director of Development, Kansas City Southern Lines, Kansas City Southern Bldg., Kansas City 6, Mo., for Information and Cooperation.

KANSAS CITY SOUTHERN *Lines*

RESOURCES FOR POSTWAR INDUSTRIES ALONG KANSAS CITY SOUTHERN LINES

Vast and varied natural resources are available for economical, profitable industrial development in the six states served by Kansas City Southern Lines. More than 90% of all America's bauxite for aluminum; 70% of the nation's zinc—these are only two of the "firsts" of this potentially great industrial area. Right at hand, too, are the means of economical fabrication and production—coal, oil and gas for fuel and power; wood, stone and cement for construction; a variety of metals and minerals; skilled manpower, and direct, efficient transportation to all parts of North, Central and South America over Kansas City Southern Lines and through five world ports.

PROCESS CONTROL with the DuMONT *Cyclograph*

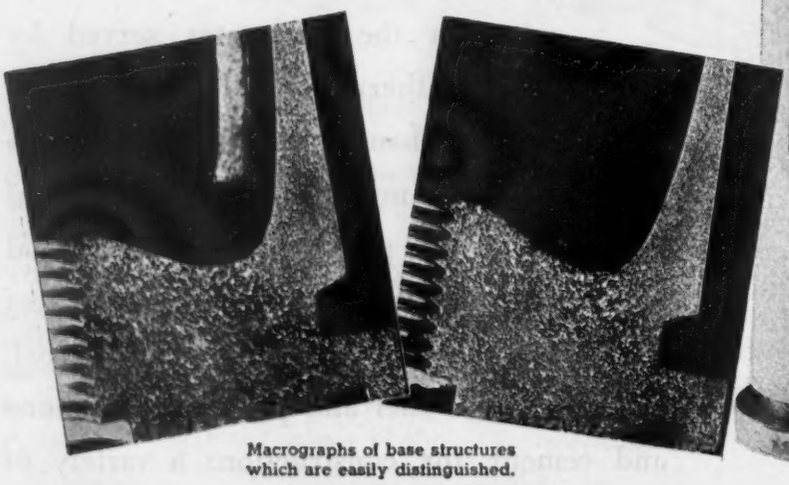


Most Cyclograph applications can be classed as inspection operations on finished products, or salvaging operations on mixed good and bad parts. However, one growing use of the Cyclograph is in the control of a process so that manufacture can be stopped as soon as the process varies enough so that unsatisfactory pieces are produced.

For instance, cartridge cases can be inspected during manufacture. Any wide variations in drawing or annealing practice which may affect the structure of the final case adversely, are immediately indicated and can be corrected before a large number of rejectable pieces have been made. The obvious savings in time and money from such a use of the Cyclograph, can be easily understood.

Some of the variations in structure in brass cartridge cases which can be easily detected, are herewith illustrated. The Cyclograph can be applied in the same manner to a wide variety of manufacturing processes for munitions and all types of metal parts.

Write for Literature . . .



Macrographs of base structures which are easily distinguished.

Photomicrographs of wall structures which are easily segregated by the Cyclograph.

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DUMONT *Precision Electronics & Television*

ALLEN B DUMONT LABORATORIES, INC., PASSAIC, NEW JERSEY · CABLE ADDRESS: WESPEXLIN NEW YORK

IN CANADA: CYCLOGRAPH SERVICES, LTD. 12 JORDAN ST., TORONTO, ONTARIO.

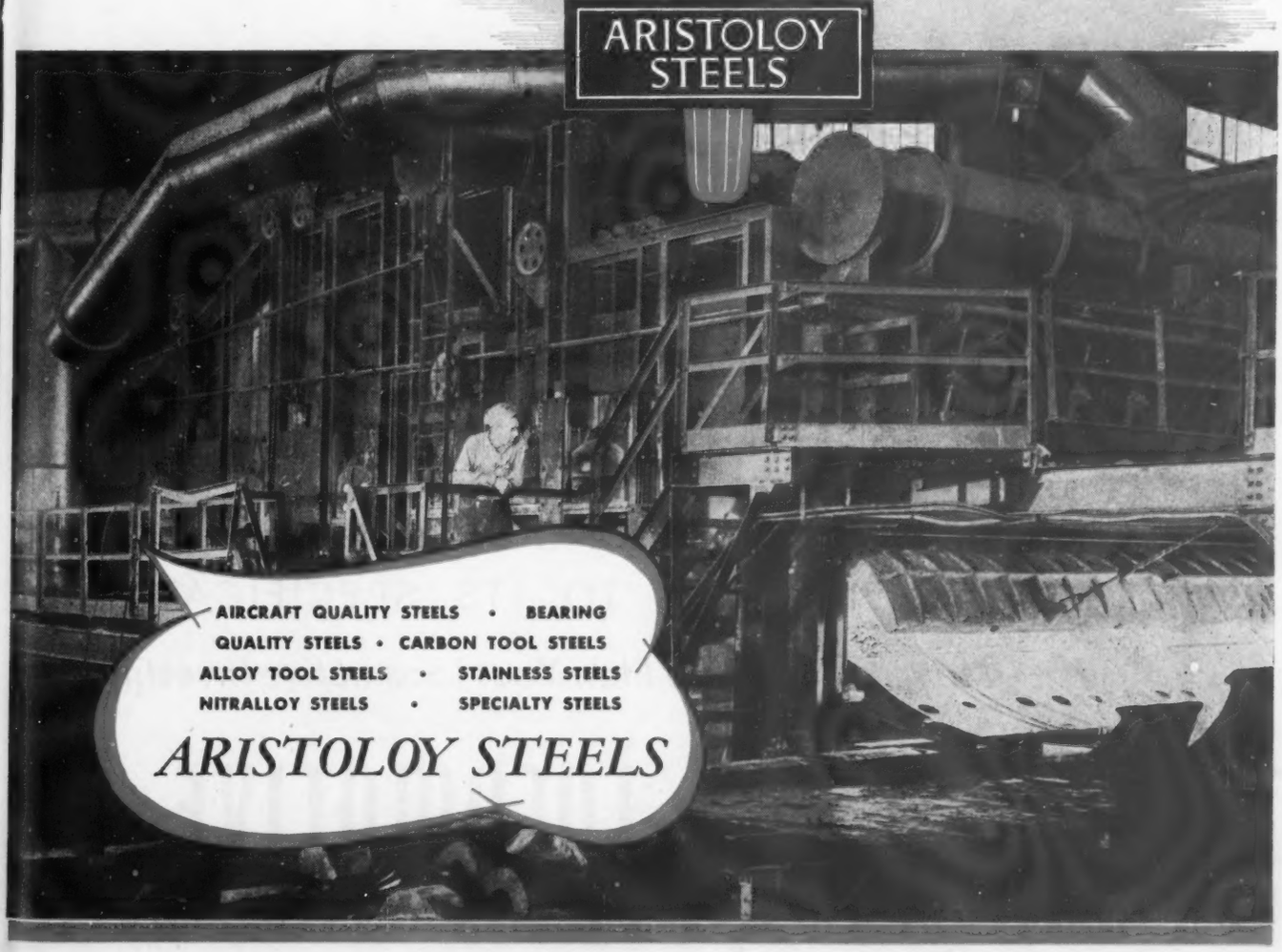
The quality of every finished product depends upon equipment and care taken in every operation in production. Copperweld's Mill Heating Furnaces are automatically controlled and three zone firing systems assure uniform heating. Uniform heating is very important in producing top quality steels. The

Turning on the heat...for *Quality*

illustration above is Copperweld's 24" Mill Heating Furnace. The heating chamber is 60 feet long and 22 feet wide and has a 50 ton per hour capacity. It may be fired by either gas or oil.

Such equipment and care are typical of every operation in making ARISTOLOY Steels. That's why ARISTOLOY has earned the enviable reputation of "TOPS" in electric furnace steels.

COPPERWELD STEEL COMPANY
WARREN, OHIO
ARISTOLOY INTERNATIONAL COMPANY, WASHINGTON, D. C.
Branches in Principal Cities



No. 2 Now in Service

1943 Rustless Iron & Steel Company placed in service a Whitcomb 12 ton gasoline mechanical locomotive to convey charging cars from the scrap yard to the melting department.

1945 Number 2 placed in service to transfer heats of steel from the melting department to the reheating furnaces of the rolling mill. The unit is identical to No. 1 except it is designed with clearance limitations to operate through a low and narrow tunnel.

This is just one more case where the performance and reliability of a Whitcomb resulted in a repeat order. There is no better way to emphasize the satisfaction of Whitcomb owners all over the world. You can forget about your transportation problems when a Whitcomb takes over.

BLW
THE BALDWIN GROUP

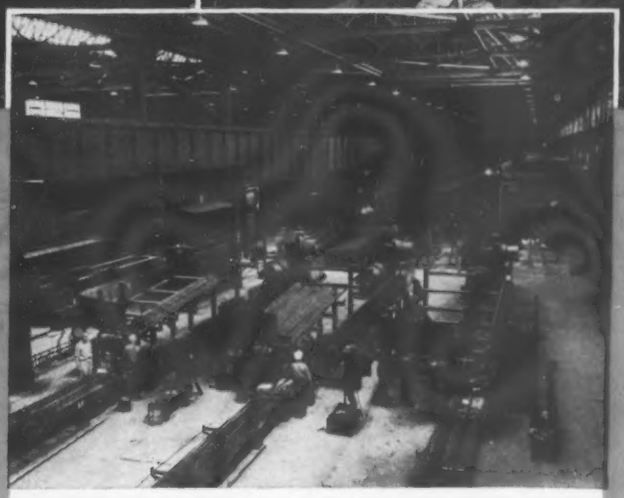
WHITCOMB HAS LONG SPECIALIZED IN SERVING INDUSTRY TO ITS SPECIFICATIONS

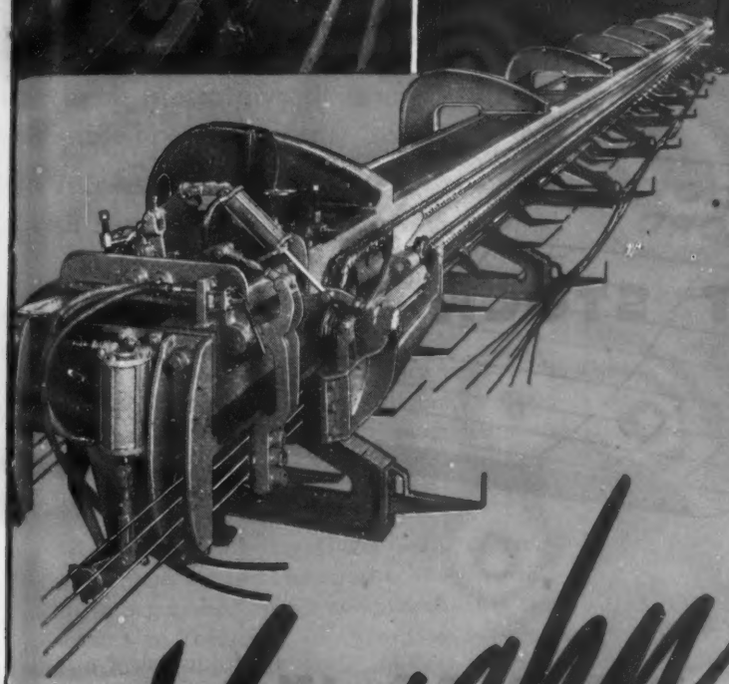
May We Help You Plan Your Locomotive Investment?

THE WHITCOMB LOCOMOTIVE CO.

ROCHELLE, ILLINOIS

SUBSIDIARY OF THE BALDWIN LOCOMOTIVE WORKS





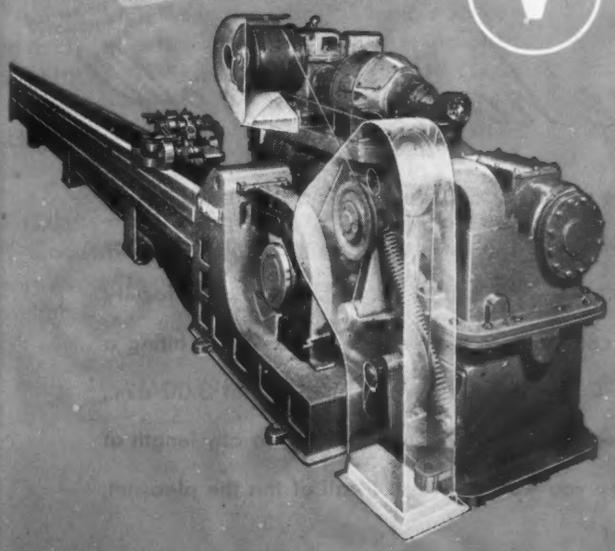
Vaughn DRAW BENCHES

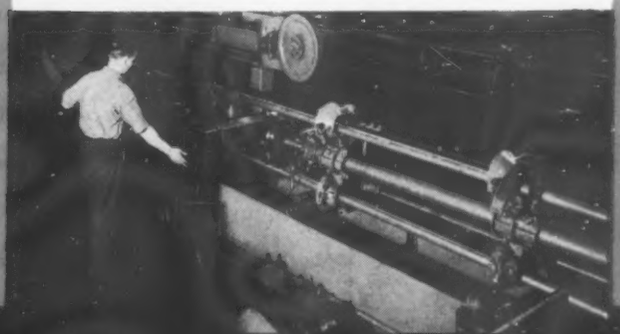
BUILT FOR SMOOTH, FAST, SAFE HANDLING OF HEAVY PRODUCTION OF

Bars, Tubes Shapes

WITH STRENGTH AND DURABILITY FOR YEARS OF PEACETIME PERFORMANCE, TOO

Plan *your* postwar cold drawing operations upon the solid base of Vaughn Draw Bench performance—for the productivity and durability that built better profits!





THE VAUGHN MACHINERY CO. · Cuyahoga Falls, Ohio ·

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

YOU CAN'T PRICE IT!

YOU CAN'T STOCK IT!

YOU CAN'T PICTURE IT!

. . . but it's all we have to sell

Service . . . it's a word difficult to picture or express but it's all we have to sell. To us at Levinson Steel it means a pleasant "hello" when you're 'phoning for steel . . . the knack of letting you know we would like to be helpful . . . the faculty of handling your problems in a conscientious manner. Or it may mean hiring a truck at 11:00 p.m., calling the Coast about an urgent shipment at 3:00 a.m., or getting a mill-wright out of bed at 5:00 a.m. It means going to any length at any time to do your job the way you want it done . . . all of this the pleasant, personal, amiable Levinson way!

LEVINSON STEEL SALES CO. LSS-2

33 PRIDE STREET • PITTSBURGH, 19, PA.

GAGES OF PRECISION BY WOODWORTH

ALL the facilities of the N. A. Woodworth Company are directed to one objective . . . the manufacturing of precision gages and tools with the longest accurate life to give the user the lowest possible operating cost.

Increase your production efficiency with sustained accuracy by Woodworth.

* * *

1 Speed up production and reduce costs with the Limitrol. The Limitrol Comparator Type Snap Gage checks errors involving pitch diameter, lead, taper, angle, out-of-roundness. It eliminates "feel" and reduces scrap. Write for Folder 44-L.

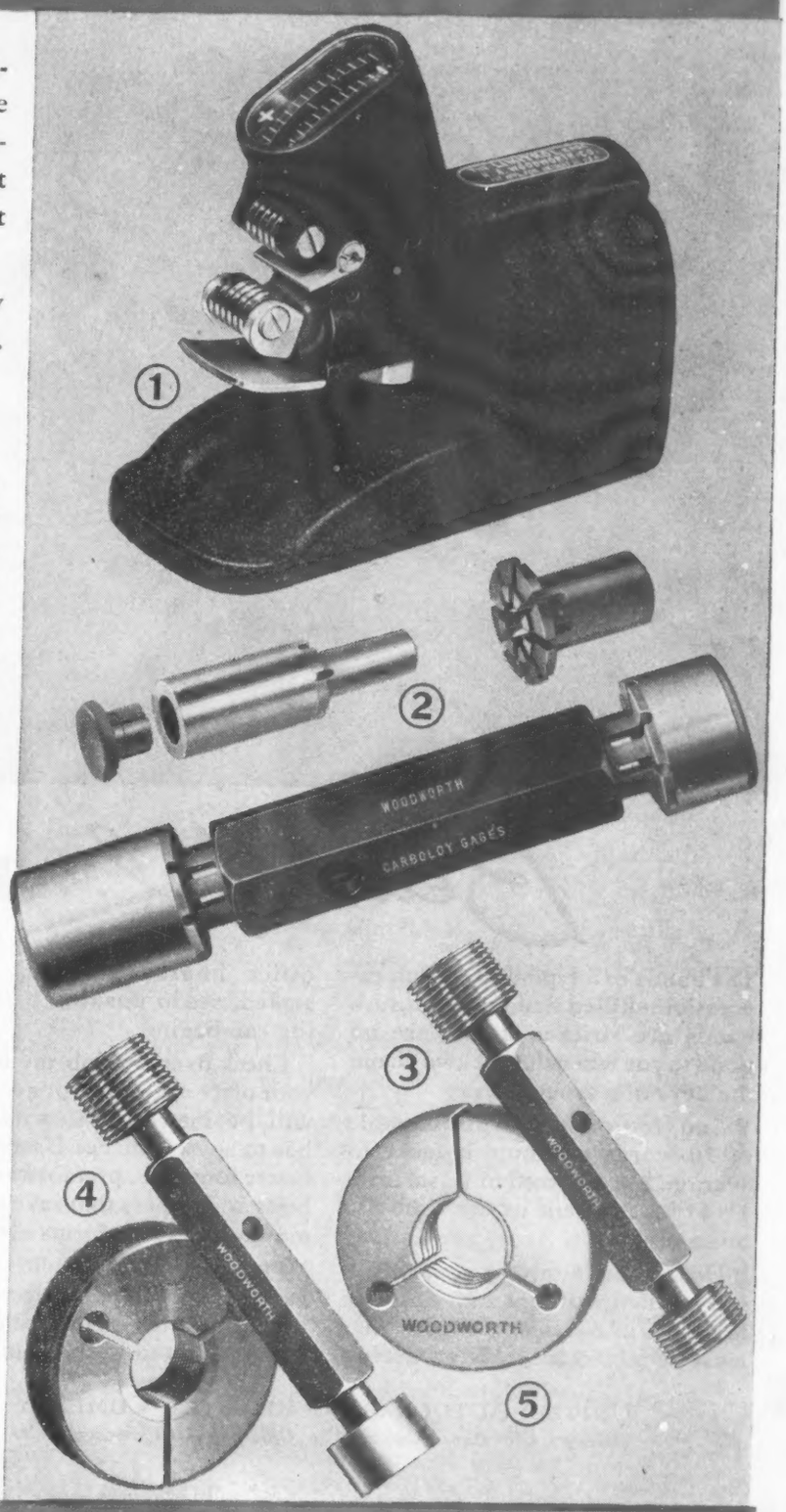
2 Woodworth Carboloy Gages are free from distortions, stresses and strains. Woodworth's exclusive segmented shank compensates for the differences in coefficient of expansion between cemented carbides and steel, thus assuring a trouble-free bond between these two materials. Write for Circular 44-C.

3 Woodworth Durplate Gages are noted for their long life and great accuracy. The Durplate process is exclusively a Woodworth development and confirms the Woodworth slogan, "accuracy you can trust."

4 Woodworth gages of cast Stellite alloy are tough, high wear-resistant . . . have a service life many times that of steel. Gage life is increased from 10 to 20 times. Stellite Cast Alloy Gages are non-corrodible and non-magnetic . . . have a coefficient of expansion close to steel...with other desirable characteristics. Write for Folder 44-S.

5 Gages of Nawlide, a specially processed Woodworth alloy, are outwearing ordinary steel gages many times with no sacrifice in toughness.

ACCURACY YOU W CAN TRUST



WOODWORTH

N. A. WOODWORTH CO., SALES DIVISION, 1300 E. NINE MILE ROAD • DETROIT 20, MICHIGAN

PRECISION GAGES • PRECISION MACHINED PARTS • PRECISION TOOLS

Beautiful... but dumb

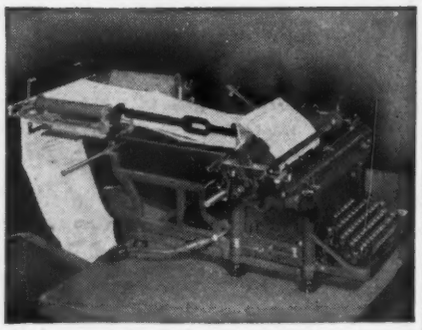
The hands of a typist! Beautiful, expressive, skilled hands . . . but such hands are stricken dumb, are no good to you when they're away from the keys of a typewriter.

And, too often, a typist capable of 70 words a minute is lucky to average 25 . . . forced to waste from 17 to 78 per cent of her time because of *you*.

How come? Simply by providing such skilled workers with obsolete forms. Time-wasting forms that must be fabricated by hand during office hours — aligned, carbon stuffed, set in position before typing can begin.

Check over the job the forms in your office are doing today. And you will be interested in what Uarco has to show you. For Uarco creates better forms . . . prefabricating carbons and papers that save time and money wherever forms are used.

Spend a half hour with a Uarco representative. He'll help you select the right forms . . . forms that allow your typists to keep typing.



Uarco Multi-Fold Continuous Strip Forms. They bring easy handling and loading to typewriters, bookkeeping or billing machines. Perfect alignment—carbon-positioned—consecutively numbered. This particular form provides legible, clean copies. Easy to set up, it feeds the machine while the typist types. For further information, write today.

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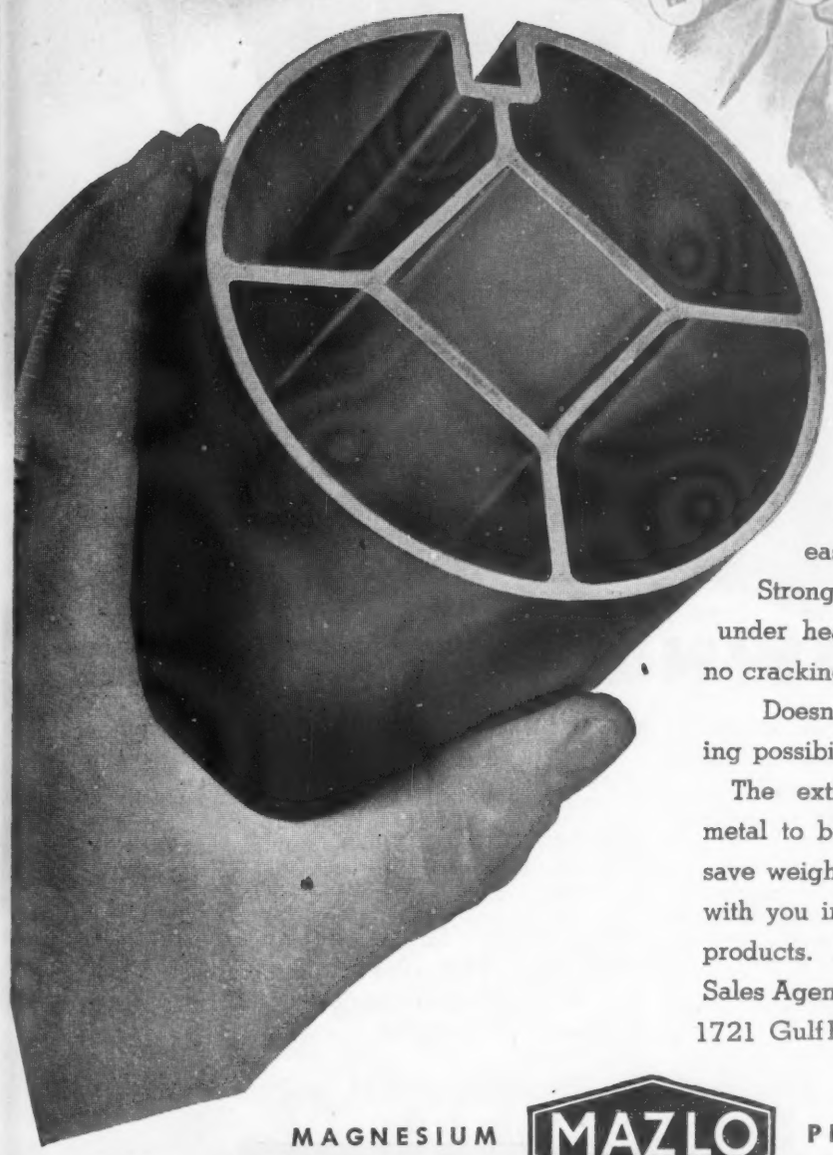
consider this extruded shape, for example



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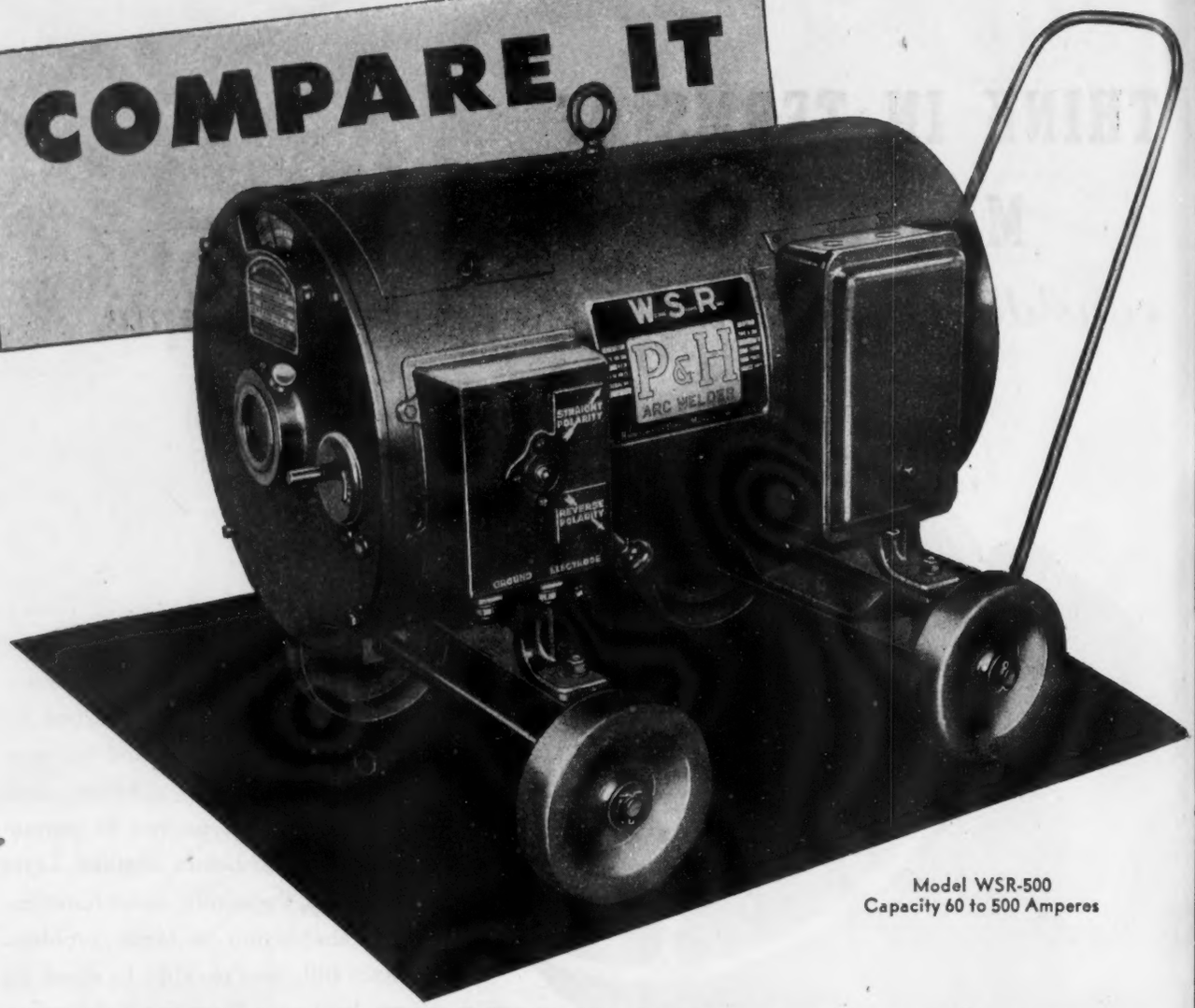

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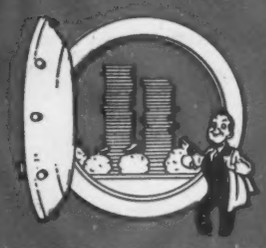

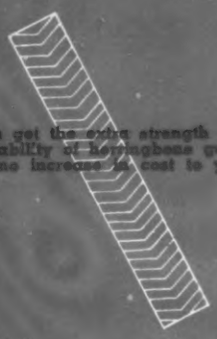

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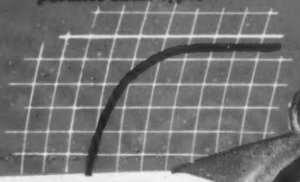

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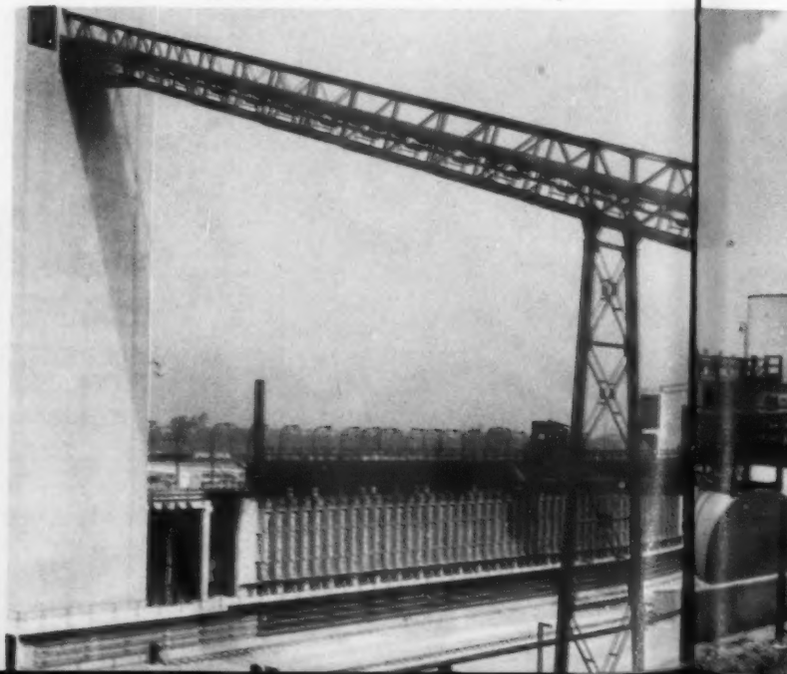
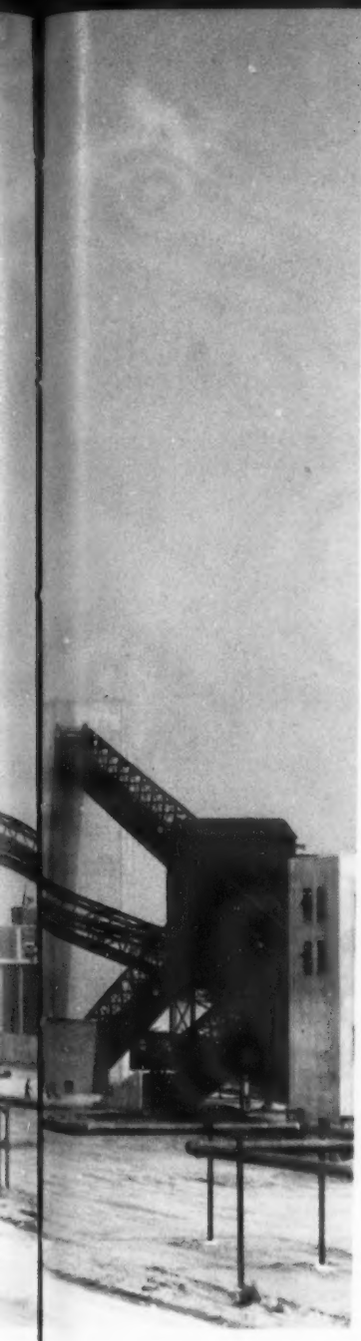
General view of the plant

The byproduct plant

The pusher side of the coke-oven battery





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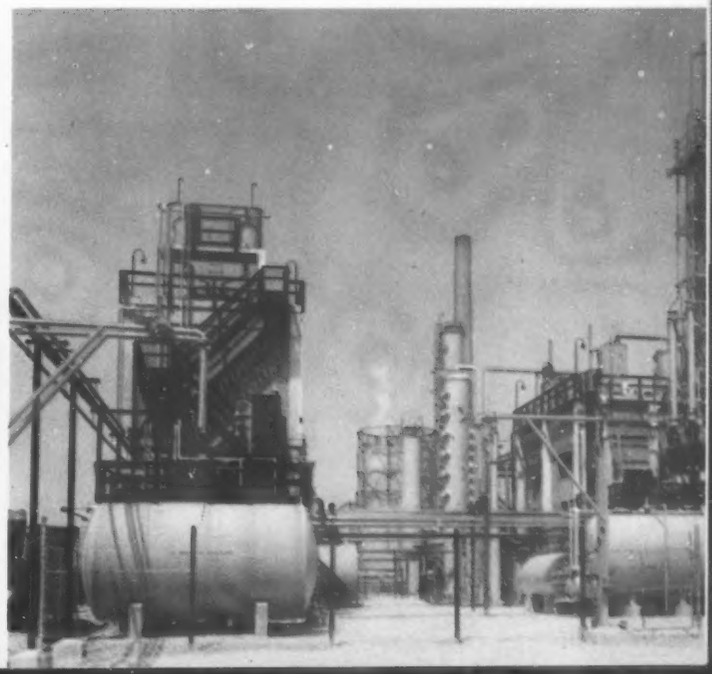

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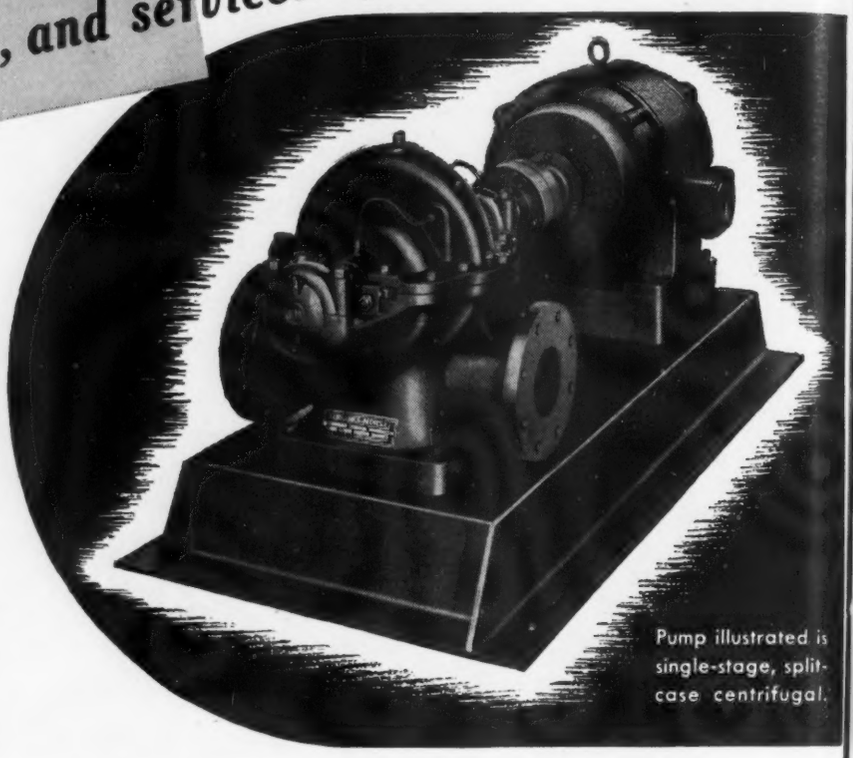

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Published by THE PENTON PUBLISHING CO., Penton Bldg., Cleveland 13, Ohio, E. L. SHANER, President and Treasurer; G. O. HAYS, Vice President and General Manager; R. C. JAENKE, Vice President; F. G. STEINEBACH, Vice President and Secretary; E. L. WERNER, Assistant Treasurer.

Member, Audit Bureau of Circulations; Associated Business Papers, Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $6; two years $10; all other countries, one year $12. Single copies (current issues) 25c. Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879.

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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 116, No. 26 June 25, 1945

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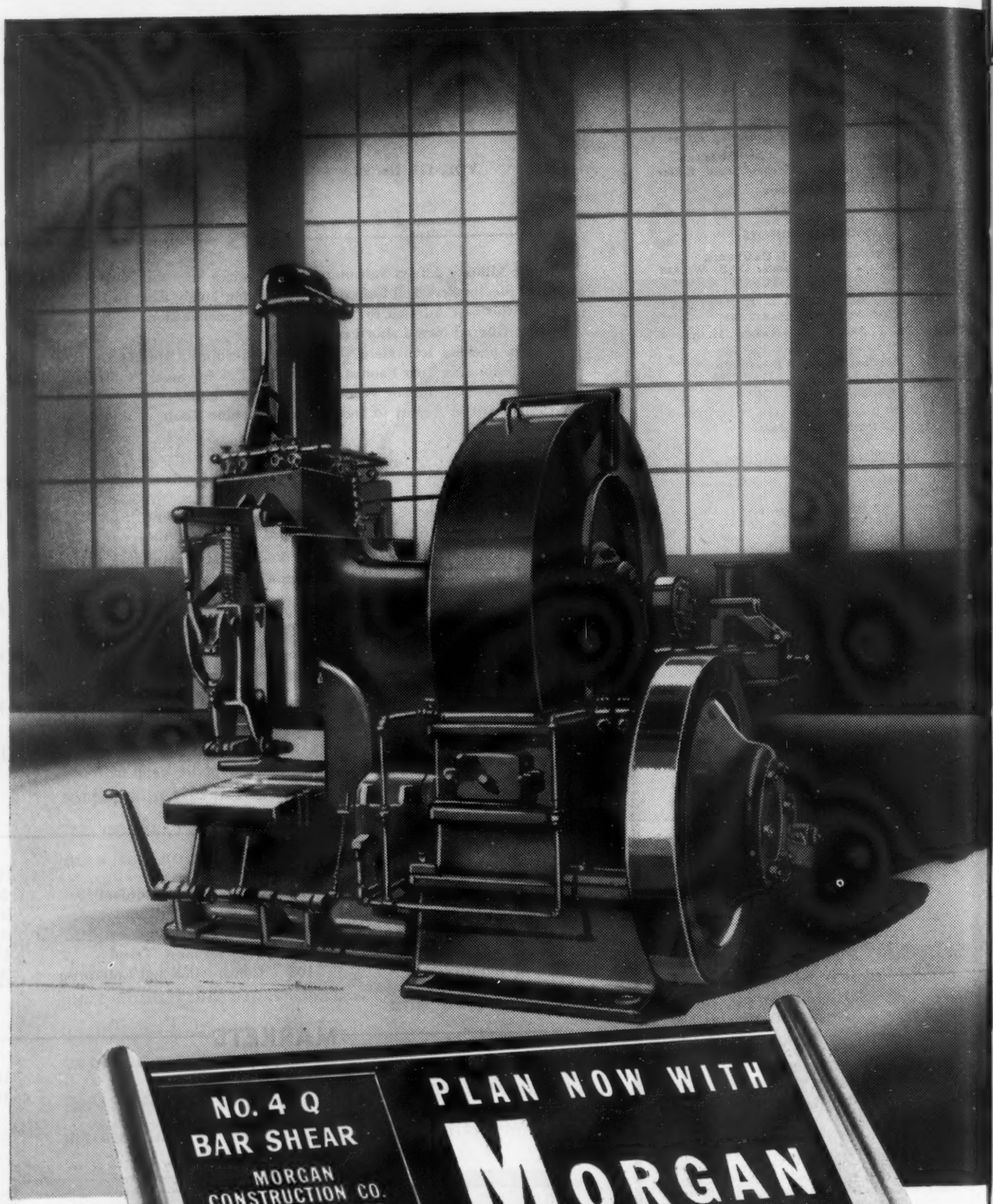

English Representative: International Construction Co., 56 Kingsway, London, W. C. 2, England

STEEL
June 25, 1945

Light on Machine Tools

On pages 89-100 of this issue is a summary of the results of an exhaustive survey conducted by this publication to ascertain the views of machine tool users on questions of great importance to American industry.

Seven questions were asked: What specific types of machine tools does industry now have and intend to buy? 2. Does industry expect to buy postwar-model machine tools, surplus government-owned machines, or rebuild present models? 3. Would a more comprehensive trade-in program lead to a greater replacement of older machines? 4. Will more special-purpose machines be used? 5. What tools—carbide, cast-Stellite or high-speed steel? 6. What about superspeed milling, negative rake machining and machining to finer finishes and closer tolerances? 7. What features does industry want in postwar machine tools?

Answers to these questions were received from 2358 plants. Because of their diversification in size and type of operation, it may be assumed that the views expressed are truly representative of the opinion of management in the 11,000 American plants performing machining operations on a production basis.

The returns are highly significant. They show that machine tool users expect to purchase a great variety of machines in substantial volume, that 89.1 per cent will buy either postwar-model or surplus government-owned machines or both, that 83.9 per cent favor a suitable trade-in program and that 45.8 per cent expect to use more specially built machines.

Carbide tooling is highly favored. Of the plants replying, 69.1 per cent plan to machine to finer finishes and closer tolerances, 40.2 per cent plan greater use of superspeed milling and 29 per cent plan greater use of negative rake machining. Features most desired in postwar machines include centralized lubrication, more accessible controls and electric and hydraulic units, hardened and ground ways, built-in lighting, sturdier bases and motors for high speed machining, chip disposal systems and vibration reducing mountings.

This information can help industry in three ways. First, in giving machine tool users a composite of their own answers, it points up definite trends of opinion. Secondly, it offers designers, builders and sellers of machine tools an authentic guide as to what their customers want. Third, it provides basic data for all persons concerned with government and industry policy in important matters affecting machine tools in the transition and postwar periods.

We share with the thousands whose co-operation made this study possible the hope that it will prove to be useful in all three ways.

REAL TEST IS AHEAD: Action of the Senate, by a decisive vote of 54 to 21, to extend the Reciprocal Trade Agreements Act for three years marks another step toward participation in postwar world co-operation by this nation.

Study of the debate on this legislation indicates a natural difference of opinion. If one sweeps aside the arguments held over from the historic feuds on free-trade versus high-tariff, he finds that the current debate is largely between those who look upon international trade from the standpoint of the interests of the nation as a whole and those who approach the problem from the viewpoint of the interests of a single industry or company. To the former, high imports to balance high exports seem absolutely imperative. To the latter, the threat of low tariffs to a specific, established domestic business seems to be paramount.

However, the mere extension of the trade agreements is not a final action. The real test will come

(OVER)

when the nation tries to work out detailed agreements under the extended act. When such agreements are operative on a grand scale, it will be possible to see how much the theory of what seems to be good for the nation as a whole clashes with what seems to be good for individual interests.

—p. 102

• • •

TOO MUCH CONFUSION: Disclosure that former Senator Guy M. Gillette resigned from the Surplus Property Board because of disagreements on policy is one of many signs that surplus disposal affairs are in a mess.

Gillette objected to the policy of selling government-owned equipment to contractors in possession of the plants in which they are located. He also objected to selling or leasing government-owned plants that still are busy on war work. Both objections are based on fears that these policies will play into the hands of favored interests and discriminate against other potential buyers.

Perhaps these dangers exist, but they can be held to negligible proportions by good administration. There is bound to be some discrimination under any policy. The great need now is to get the machinery of surplus property disposal going at the earliest possible moment. There has been far too much delay and far too much quibbling over prerogative. Maybe a single, competent administrator, rather than a board, is one of the answers to the problem.

—pp. 79, 81

• • •

CENTERS MOVING WEST: American Iron & Steel Institute has calculated that the center of steelmaking capacity in the United States is at a point a mile south of Dola, a village in Hardin county, O. Since 1940, the geographical center of steel has moved west about 66 miles and south about 6 miles. The average shift westward during the war years has been about 16½ miles a year.

The center of population is near Carlisle, in Sullivan county, Ind. Dola, the center of steel, is about 275 miles northeast of Carlisle. This distance seems small in a nation where more than 131 million persons are distributed over nearly 3 million square miles of continental land area. At its rapid westward pace of 16½ miles a year, the steel center probably has been gaining on the population center, which had moved west only 16 miles in the decade preceding 1940.

—p. 83

SIGNS OF THE TIMES: Bug bomb insecticide dispensers for use by the armed forces to combat mosquitos and other insects are being produced at the rate of 50,000 per day in plants which manufactured refrigerators in peacetime. The containers must be light in weight (p. 118) and resist high pressures. Manufacturers are studying postwar market possibilities of this device. . . . Most machine tool builders use the standard machine tool gray sponsored by the National Machine Tool Builders Association, but a survey indicates that 67.2 per cent of machine tool users (p. 100) favor colors which contribute to safety and to a better lighting of work areas. . . . Since 1941, Civil Aeronautics Administration has approved 125 types of surplus military aircraft as suitable for use in civilian flying (p. 114) and during the same period has found 130 models ineligible for civil certification. . . . Included in the WPB report on wartime steel expansion prepared by W. A. Hauck of the Steel Division is a history, description and statement of progress of the experimental sponge iron project operated by Republic Steel Corp. at Warren, O. In a test run about 2000 tons of iron ore concentrates charged for experimental reduction resulted in a product ranging from totally unreduced to highly reduced material (p. 122) of which 400 tons averaged 75 per cent or more metallic iron. A small tonnage of this product, reasonably well briquetted, was used in a heat in an electric furnace with satisfactory operating results. . . . During the past four years Chrysler has delivered to the armed forces enough tanks to equip more than 100 armored divisions (p. 109) and has supplied 86,000 tons of spare tank parts. . . . United States Steel Corp., in summarizing wartime advances in steelmaking (p. 116), believes that the equivalent of 10 years of technological progress has been encompassed in four years under the pressure of war. . . . Between 1500 and 2000 tons of jigs, dies, fixtures and other tooling used in turning out 7100 Douglas A-20 attack bombers, originally costing $10 million and made obsolete by abandonment of the A-20 model late in 1944 (p. 112), have been sold by Douglas Aircraft Co. as scrap at $8.05 per ton. . . . Steel company earnings in 1944 were lower than in any preceding war year (p. 87) and much lower than in the "good" peacetime year of 1937, when output was 37 per cent less than in 1944.

E. L. Shaner

EDITOR-IN-CHIEF

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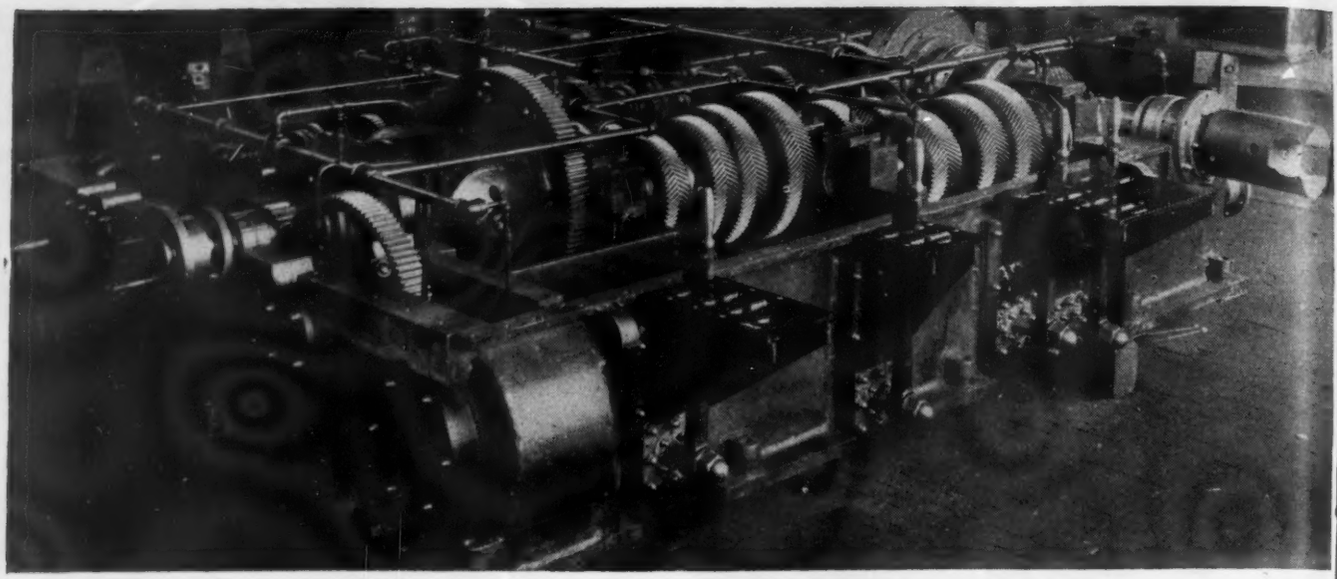
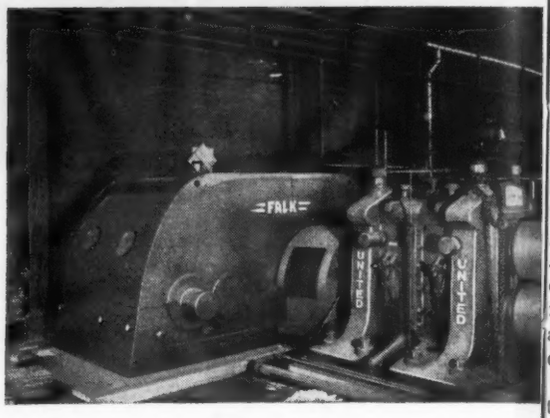


"SHEAR" NECESSITY



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Senators Query SPB on Policy

Military Affairs subcommittee criticizes Surplus Property Board for delay in submitting report on government-owned iron and steel plants. Notes that war need for some facilities is running out

"Majority" members of the Surplus Property Board are Robert Hurley, left, former governor of Connecticut, and Lt. Col. Edward Heller. Guy M. Gillette, former senator and chairman of the board, told a Senate committee that he resigned because of disagreement with the other two members on policy. NEA photo

CRITICAL review of the Surplus Property Act and its administration by the Surplus Property Board is being undertaken by the War Contracts Subcommittee of the Senate Military Affairs Committee.

Impatient with delays in the development of plans for the orderly disposal of surplus plants and property, the committee has administered a verbal spanking to board members for failure to submit a report covering the disposition of government-owned iron and steel plants. At the same time, the committee subjected board members to intensive questioning to determine what changes, if any, are necessary to make the Surplus Property Act workable.

In a progress report to the full Committee on Military Affairs and the Special Committee on Postwar Economic Policy and Planning the subcommittee noted that the board's long overdue report had not yet been received and that "if plants become surplus before the submission of the required reports, the development of comprehensive industry-by-industry disposal plans as comprehended by the act will be endangered."

Object to Piecemeal Disposal

"Piecemeal disposal of large plant units, even on a temporary lease basis, is likely to result in complete disregard of the long-run objectives of the act," the board added.

"The committees are not unmindful of the difficulties which have hampered the Surplus Property Board but they also are aware of the purpose Congress had in mind in passing the Surplus Property Act, of leaving nothing undone to effect the best possible utilization of government-owned plants for the advancement of a prosperous free economy."

The necessity for formulating policies for the disposal of iron and steel plants is particularly pressing, says the committee's report, now that the continued operation of these plants no longer is assured.

"Only a few days ago, the War Production Board announced that the structural mill of the Geneva plant would be compelled to close down early in June, and that the plate mill had orders on hand to continue operations only until some time in August."

Questioning of the three members of the board, former Senator Guy M. Gillette, who recently submitted his resignation as chairman, Robert A. Hurley, former governor of Connecticut, and Lt. Col. Edward Heller, revealed that the members have been in disagreement on policy and that this disagreement had prompted the resignation of Mr. Gillette. The action which forced his resignation, Mr. Gillette said, was the board's adoption of a regulation permitting the sale of government-owned machine tools to contractors in possession of the plants in which they are located.

Mr. Gillette objected to this regulation in the belief that "it created a group of preferential buyers; it discriminated against potential bidders who did not have these tools in their plants." Further, Mr. Gillette did not like the feature which releases contractors and subcontractors from their purchase options, and which enables them to buy at less than the terms called for by the options.

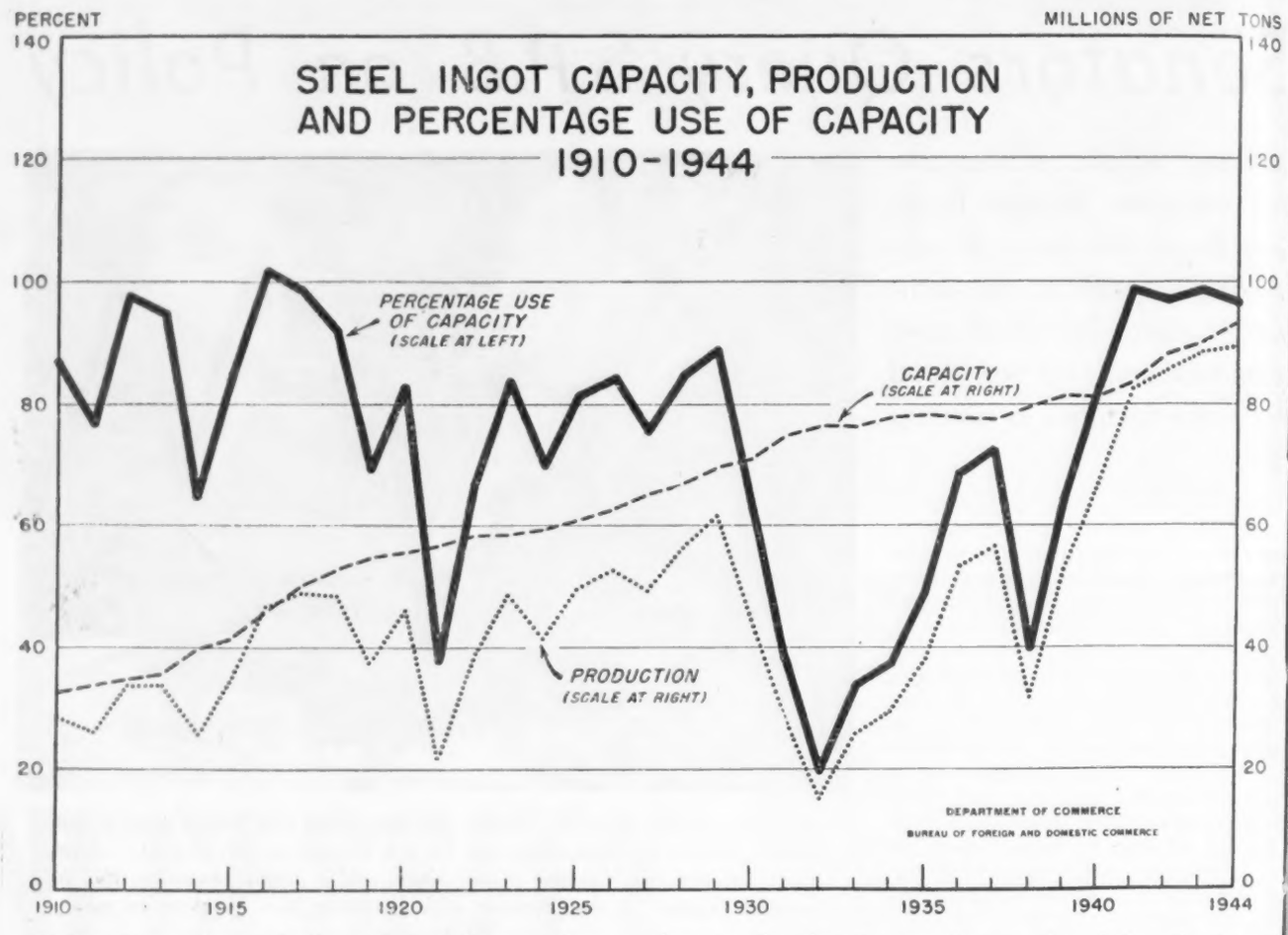
Mr. Hurley explained that he voted for the regulation because he does not wish to see machine tools taken out of contractors' plants at the expense of the government, brought into warehouses and then sold indiscriminately. This would mean heavy expense, he explained, but the principal result would be to delay getting these tools into the hands of people who would use them for production and to provide employment.

Mr. Hurley scoffed at the charge that there would be discrimination in such sales; there will be more than enough surplus machine tools to go around, he said. As a matter of fact, said Mr. Hurley, only one-third of the government-owned machine tools are in plants operated by private contractors while the other two-thirds are in government plants.

Prices Set Under Clayton Formula

Colonel Heller also contended that there is nothing discriminatory about selling to the contractors at lower than the prices stipulated in options arranged by the contracting agencies; in all cases, he explained, the prices charged are those set under the Clayton formula.

Another point on which there was disagreement was the majority policy of encouraging the Defense Plant Corp. to sell or lease government-owned plants that still are busy on war production. Mr. Gillette feared that the leasing policy might play into the hands of companies having monopolistic intentions; a lessee with such an objective in mind, he said, might destroy a plant for all



Steel ingot capacity, production and percentage use of capacity from 1910 through 1944 are charted above. Chart illustrates the close to capacity operation during the two wars and the extremely low output during the early thirties

useful purposes before expiration of the lease.

In defending the leasing policy, Colonel Heller pointed out that government-owned plants constitute some 20 per cent of the country's industrial capacity at the present time. It is impossible to foresee the exact peacetime place of each one of these plants at this early date, so that many interested parties naturally hesitate to buy a plant outright. In many of these cases, he said, it is necessary to take "a good, long look," and disposal under a lease good for a period up to five years gives the potential buyer the opportunity he needs to take that good, long look.

"A great number of such negotiations are now in progress," said Colonel Heller, "and the board now is in process of writing a formal plant disposal regulation. These leases are a big help in getting these plants into the hands of private industry, and they keep unemployment at minimum by getting them into operation at a much earlier date than would be the case if we insisted on selling the plant."

Subcommittee Chairman Joseph C. O'Mahoney (Dem., Wyo.) admitted frankly that his group is interested in ascertaining the present law's weak points. Inasmuch as the board's present policies, of selling machine tools to contractors in possession, and disposing of plants under leases, figured prominently in the questioning of the board members, it is quite likely that the subcommittee soon will take a stand on these two issues.

The subcommittee's report contained considerable basic information on wartime changes in the steel industry and on the industry's probable future. It noted the emergency-born expansion of the industry's capacity of between 16 and 17 per cent from about 82 million tons to approximately 96 million tons, at a total cost of about $2.5 billion. It estimated that if the present capacity is to be fully utilized during peacetime a gross national product of about $200 billion in terms of the 1945 dollar will be required.

Outlines Base for Disposal Policy

In the light of the wartime changes in the industry, the subcommittee suggested the following issues should be considered in formulating a disposal policy for government-owned plants:

1. What disposal policy, if any, can achieve fuller utilization of the productive capacity?

2. If any existing trade practices in the industry have prevented such fuller utilization, what disposal policy, if any, will be able to overcome the adverse effects of such practices?

3. If it develops that present capacity exceeds the probable postwar demand, what disposal policy shall be adopted with respect to government-owned steel plants?

4. Notwithstanding possible excess steel capacity, what shall be the disposal policy if it is found that some government-owned plants can produce steel at a lower cost than private plants?

5. What should be the disposal policy if these benefits of lower prices can be made available only after alterations have been made in the government-owned plant?

6. What disposal policy will carry out most effectively the mandate of the act (a) to discourage monopolistic practices; (b) to foster the development of new independent enterprise; and (c) to strengthen and preserve the competitive position of small business concerns?

7. If in particular marketing areas the expansion of steel-consuming industries is dependent upon the assurance of availability of steel products at low prices, what disposal policy, if any, should be adopted in that regard?

8. In the light of the findings to the above questions, what should be the

appropriate instrument of disposal for each particular property?

The sucommittee opined that from this statement of issues that a great deal of specific information is required before disposal policies are formulated.

"If the objectives of the Surplus Property Act are to be achieved, this information, which is costly to secure and which is confined now to knowledge of several government agencies and a small number of companies which have first-hand knowledge on the basis of past operations, must be made accessible to all those who might possibly be interested in the utilization of these plants. The securing of this information is the joint responsibility of the Surplus Property Board and the Defense Plant Corp.

"On the basis of such information, it should be possible to formulate a disposal plan for government-owned iron and steel plants designed to achieve the long-run objectives of the act. This plan must set forth with definiteness what disposal of the key government-owned plants is recommended. The plan must be prepared in advance of disposal and on the basis of the objectives of the act. It must not be confined to a mere listing of bids which may have been received and then suggest in each instance a choice of the lesser evil."

Surplus Tool Disposal Is Discussed At ASME Meeting

The American Society of Mechanical Engineers held a sectional meeting June 16 to 19 at the Stevens Hotel, Chicago, at which many subjects of more than local interest were discussed. Among the speakers was A. G. Bryant, vice president, Cleereman Machine Tool Co., and president, Bryant Machinery & Engineering Co., Chicago, who spoke on "Surplus Machine Tools—America's Opportunity."

Mr. Bryant said the surplus tools and other capital equipment, while staggering in their effect upon the industries involved, may under sound public policy, be the country's most important instrument for building economic prosperity and for maintaining international peace.

He summarized his conclusion with respect to disposal by stating Congress should establish promptly a policy which will require the setting aside as a strategic military reserve, a minimum of 50 per cent of the general purpose machine tools and production equipment that has been owned by the government during the war; that Congress clarify and simplify the Surplus Property Act by establishing a single administrator with full authority and responsibility and who may have for his support an advisory council, and by eliminating the futile restrictions as to priority of sale, reviews by the attorney general, and other provisions of the present act which create confusion and cause unnecessary delay; and, let the President and Congress instruct the administrator and his subordinate organizations to act boldly, fearlessly and with complete authority in developing co-operative arrangements with industry for the utilization of remaining surpluses.

The four-day meeting of the section was replete with addresses devoted to various management and engineering problems. Sessions were held on management problems, power, aviation, metal cutting, production engineering, applied mechanics, gas turbine and heat transfer.

Set Disposal Policies for Contractors' Inventories

A new regulation controlling disposal of contractors' inventories was issued last week by the Surplus Property Board. It establishes a pricing policy to guide the clearance of war plants for reconversion. Plant equipment, such as machine tools and machinery, is not affected.

It provides generally that sale prices will be either at market levels of "fair and reasonable prices, but not less than 50 per cent of cost." Contractors who keep property as part of their termination settlement must pay the full price that could be obtained if the property were sold. Furthermore, they must use it themselves and not resell it for profit.

Rules governing waste, scrap and salvage provide that such property must be sold on the open market. In cases involving property costing more than $25,000, a reviewing authority must approve the intention to declare it unserviceable.

All serviceable property costing more than $10,000 to be sold or kept for resale by the contractor must be advertised for sale in "reasonable sized lots" to establish a market price. Small lots costing not more that $300 may be retained or sold at the best obtainable price.

Present, Past and Pending

■ STEEL INDUSTRY USED VAST SUPPLIES TO BEAT GERMANY

NEW YORK—Domestic steel industry consumed about 375 million tons of iron ore, 187 million tons of coke and 155 million tons of scrap in three years and five months between the attack on Pearl Harbor and the defeat of Germany, according to the American Iron & Steel Institute. These amounts equal consumption in the 1932-39 period.

■ OVER 15,000 TONS OF STEEL LOST IN GREAT LAKES STRIKE

DETROIT—Wildcat strike at Great Lakes Steel Corp., Detroit, June 15-17, caused an estimated loss of over 15,000 tons of steel and likely will unsettle operations during the balance of this month.

■ RAILWAY SPRING FIRMS SUED IN FEDERAL COURT

WASHINGTON—Ten manufacturing companies, a trade association and a patent holding company were charged with conspiracy to suppress competition in manufacture and sale of railway springs and spring plates in a suit filed last week by the attorney general in U. S. District Court, Hammond, Ind.

■ SEEKS INVESTIGATION OF SCRAP SHIPMENTS TO JAPAN

WASHINGTON—Investigation of shipments of scrap to Japan during ten prewar years is asked in a resolution introduced in the House last week by Rep. J. Parnell Thomas of New Jersey.

■ STEEL INGOT CAPACITY LEVELS OFF

NEW YORK—Steel ingot capacity has leveled off to a point where the American Iron & Steel Institute no longer finds it necessary to make a semiannual survey. Ingot capacity figures once again will be revised only as of the end of each year.

■ CARNEGIE-ILLINOIS NEGOTIATES FOR CHICAGO TRACT

CHICAGO—Carnegie-Illinois Steel Corp. is discussing with officials of the city of Chicago and Park District the possibility of acquiring a submerged 80-acre tract adjacent to the company's South Works here. The move is in connection with the long-term plan of the company and does not involve its immediate postwar program.

■ U. S. STEEL DIRECTORS TO MEET IN CHICAGO

CHICAGO—Board of directors, United States Steel Corp., will hold one of its regular meetings on Tuesday, June 26, at the Chicago headquarters of the corporation subsidiaries. Directors will visit various operations of the corporation in this district.

■ STEEL WELDING WIRE DROPS 20 PER CENT IN 1944

NEW YORK—Estimated production of steel welding wire declined 20 per cent to 932,400,000 pounds in 1944 from the record output of 1,166,400,000 pounds in 1943, according to the American Iron & Steel Institute. The lower volume of shipbuilding last year mainly accounted for the drop.

Small Steelmakers Tell Congress OPA Pricing Policy Change Needed

Seven spokesmen for nonintegrated mills cite disadvantages under which they operate as result of OPA pricing procedure. Suggest amending price control law to strengthen their position for postwar

FIVE principles for amending the Emergency Price Control Act so as to permit small business to prepare properly for reconversion were advanced last week by R. K. Clifford, vice president and general manager, Continental Steel Corp., Kokomo, Ind., testifying in behalf of some 30 small nonintegrated steel producers at the hearings which the House Committee on Currency and Banking is holding on the proposal to extend the government price control law.

Mr. Clifford, who concluded the steelmen's presentation, was one of seven representatives of the small steel mills to present their views to the committee. The others were: Robert W. Wolcott, president, Lukens Steel Co., Coatesville, Pa., who introduced the arguments; H. W. Boal, vice president and treasurer, Andrews Steel Co., Newport, Ky., David Thomson, president, Phoenix Iron Co., Phoenixville, Pa., Lauson Stone, president, Follansbee Steel Corp., Pittsburgh, John F. Budke, president, Parkersburg Iron & Steel Co., Parkersburg, W. Va., and D. V. Sawhill, president, Mercer Tube & Mfg. Co., Sharon, Pa.

Mr. Clifford pointed out that since the National War Labor Board's directive of last November in the steel wage case, the eighty odd companies party thereto, have labored under conditions which threaten to cause financial ruin to many of the smaller companies. Shift differentials, increased vacation pay, and inequity adjustments were made retroactive to expiration of previous labor contracts, in the case of his company, Jan. 4, 1944, he said, and it was not until Jan. 11, 1945, that price relief was granted the industry by the Office of Price Administration on a few steel products in a so-called interim price order. Such price increases could not be made retroactive.

Financial Condition Endangered

Because of the incomplete nature of the interim relief some of the smaller steel companies were still losing money while the financial condition of others was seriously endangered. Mr. Clifford declared to the committee that it is essential that the small companies earn a fair return on operations. This is necessary, he said, to enable them to prepare properly for reconversion and he suggested that the Emergency Price Control Act be amended in accordance with the following principles:

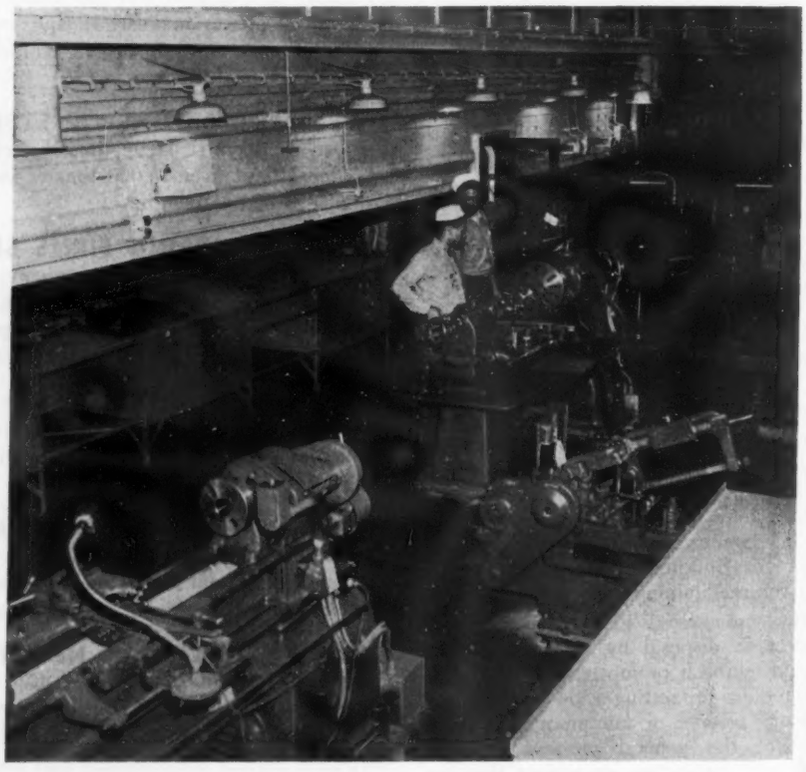
1. To provide that in no event shall a maximum price be maintained or established for any commodity which does not return to the producers or manufacturers of that commodity the average cost of producing and distributing such commodity. Statutory provisions which enable OPA to grant individual relief where necessary, of course, should remain to take care of individual cases which require such relief under this revised commodity standard.

2. To provide that in computing such cost the term cost shall be defined to include labor, materials, overhead, sales, and advertising expense, administrative expense, depreciation, and all other expenses allowed as deductions by the federal income tax laws. Such costs to be allocated to the commodity in accordance with sound accounting methods.

3. In connection with labor cost, the statute should direct OPA to give consideration to all wage adjustments ordered by the National War Labor Board or other authorized federal agency which are applicable to a substantial portion of the producers of any commodity. Where the amount of any such adjustment is not ascertainable immediately, the OPA should be required to give effect to such adjustment on a fair estimated basis, subject to revision when the amount of adjustment is definitely ascertainable.

4. To provide that in determining the average cost of producing and distributing any commodity, the OPA shall make such determination on a basis which reflects the average cost for typical producers of such a commodity, excluding peculiarly high or low-cost producers.

5. The requirement that maximum prices shall be generally fair and equitable should be retained. Under established OPA policy this requirement means that where overall industry earnings de-



FLOATING MACHINE SHOP: Inside an ARV-(E) is a fully equipped machine shop, complete from heavy machine tools to extensive testing equipment for repairing aircraft engines. This shot of a portion of the machine facilities of the U.S.S. CHLORIS was taken at the Ambridge, Pa., outfitting dock of American Bridge Co. Having concluded its contract for LSTs, this shipyard is turning out four of the ARV units, which are built on LST hulls and work in pairs, the sister ship to the one shown being an ARV-(A), equipped with a sheet metal shop for repairing aircraft wings and fuselages

cline below earnings for a representative base period, general industry price relief shall be granted. Mr. Wolcott of Lukens Steel, told the committee that OPA policies governing the pricing of iron and steel products have placed the small, nonintegrated producers in an unsatisfactory position to meet the problems of reconversion to peacetime competitive operations.

He said that under OPA policies the effects of integration are very important, explaining that the majority of companies in the steel industry are nonintegrated, that is, they depend for their raw materials, fuel and transportation on outside sources. This is especially true of the small companies, he said.

"OPA seemingly takes the position that under the law, price revisions must be based on past experience," said Mr. Wolcott. "It has not the authority to make adjustments based on estimates of future conditions. In short, its relief cannot be projected. Since its relief is not retroactive, there is always a time lag, as conditions are not static these days.

"A large portion of this industry is faced with the immediate problem of resuming peacetime production under competitive conditions. That is true of other industries. It is particularly true of small producers in this and all industry. The smaller manufacturers already are beginning to produce less war commodities. We believe the time has come when price control policies must be revised to consider the future. This is essential if the smaller manufacturers are to operate under price structures adequate for them to maintain production and employment."

Speaking for the Andrews Steel Co., Mr. Boal presented specific data showing how price control affected his company.

The theory, he said, of setting a ceiling price for any steel product on the basis of average cost of a group of large integrated producers and then creating a subsidy for the small nonintegrated steel producer can only result in temporary financial relief and in the postwar period it will be a definite disadvantage to all nonintegrated plants.

With respect to the price adjustment announced by OPA in May, 1945, he said sales value and cost are affected as follows: Carbon steel sheet bars were increased $2 per gross ton, but the actual effect on Andrews' production cost for the first quarter of 1945 is an increase in the cost of hot-rolled carbon sheets of $2.11 per ton. The effect of a $2 increase in sales price of sheets compared to a $2.11 cost has a net result of an increase in the loss of 11 cents per ton for Andrews.

Galvanized steel sheets were increased $4 per net tons but the sales value for the first quarter of 1945 includes an OPA approved special price relief of $5 per net ton, consequently the OPA increase of $4 per ton for galvanized steel sheets does not increase the sales price for Andrews since the special relief price is $1 more than the approved increase in the industry ceiling price of galvanized steel sheets. The real effect is an additional cost for galvanized steel sheets of $2.11 per ton which results in a loss on galvanized steel sheets for the first quarter of 1945 of $13,445.

"The Office of Price Administration," said Mr. Thomson, speaking for the Phoenix Iron Co., "in the enforcement of the provisions as contained in the Emergency Price Control Act, has chosen to interpret said provisions to a point whereby marginal profit of the products produced is stated on the basis of out-of-pocket cost only, thereby making no provision whatever for administrative and distribution costs."

Mr. Thomson presented cost statistics in which it was shown that the company had to make up a deficit of $1,692,318 in the six months ending April 30, 1945, which represents the amount paid or to be paid by the company over and above relief afforded by the OPA. He said that larger tonnages, more favorable sizes, and the increases in production during the war years were the elements which permitted the company to absorb most of the increased cost.

Mr. Thomson concluded his statement by recommending that consideration be given to legislation whereby the OPA in determining cost shall include all of the justifiable costs of doing business.

The traditional spreads between the price of semifinished materials and finished products were not maintained in the price relief granted the industry in May of this year, Lauson Stone, speaking for the Follansbee Steel Corp., told the committee. At present rate of operations, according to Mr. Stone, Follansbee is more than $405,000 per year worse off than it was in 1941, this being exclusive of the cost of the order of War Labor Board's directive relating to elimination of wage inequities which the board stated might be as much as 5 cents per hour. Should this additional cost amount to 5 cents per hour, this would add another $150,000 to the company's annual cost since 1941.

Two changes in the price control law were suggested by Mr. Stone. 1. Provide that in determining production costs in any industry, all expenses including labor, material, overhead, sales and advertising expenses, taxes other than federal taxes, depreciation, depletion and all other expenses allowed as deductions by the federal income tax laws should be included. 2. Change the law so that price relationships of long standing between several commodities in the industry or between related semifinished and finished products be maintained.

Speaking for the Parkersburg Iron & Steel Co., the Reeves Mfg. Co. and the Mahoning Valley Steel Co., John F. Budke, president, Parkersburg Iron & Steel Co., told the committee it does not seem just that price control intended to protect the economy as a whole, should necessarily have a tendency to eliminate small units of industry which have survived while operating under the natural laws of competition. He declared that if in the transition period the small mills cannot profitably sell, then the OPA is establishing the rule that there is no place in industry for small, higher cost producers and that only the large integrated, or low cost, producers would be qualified to produce. This would mean, he said, that only great businesses with large resources could survive and the small mills would have to disappear.

Mr. Budke suggested that Congress provide the OPA with authority to establish prices which will reflect so far as is consistent with proper control, the presently great potential demand for the company's products as well as the increased cost of materials and labor used in producing them.

D. V. Sawhill, speaking for the Mercer Tube & Mfg. Co., told the committee that the company's ceiling prices are the same as those in effect July 1, 1938, with the exception that, due to an increase of $44 a ton for zinc, the cost of galvanized pipe was increased $6 a ton on April 9, 1941. However, in November, 1941, zinc prices were again increased, but no compensating increases in the pipe price was made. Since July, 1938, other major items in manufacturing costs have increased as follows: Fuel oil 3 1/3 cents to 6 cents per gallon; steel skelp, $2.71 per ton; wage increase on three occasions prior

(*Please turn to Page* 200)

STEEL'S CENTER

About one mile south of the village of Dola in Hardin county, Ohio, (population 175) lies the geographic center of the nation's steel industry, the American Iron and Steel Institute reported last week.

Dola, about 22 miles east of Lima, is an agricultural community without any sign of a steel plant. The nearest furnaces are in Mansfield, about 60 miles to the east.

Since 1940 the geographic center of steel moved west about 66 miles from a point about eight miles northeast of Mansfield. Wartime-increased capacity in western and Pacific Coast states re-established the westward trend of the industry which had been reversed during the thirties.

The center of steel capacity moved westward an average of about 16½ miles per year since 1940, only about one-third as far as the average annual shift between 1874 and 1933. The center shifted south approximately six miles during the war.

Small Business Advised To "Get Busy"

War Production Board chairman says program is designed to help little manufacturers but all cannot be wet nursed. Materials supply will improve during third quarter

Pickets assembled in front of the main gate of the Goodyear Tire & Rubber Co. in Akron, O., as a strike of some 20,000 employes started. NEA photo

CONGRESSMEN who tell small businessmen they are threatened with annihilation under the War Production Board's reconversion policies are adding to confusion and retarding reconversion progress, J. A. Krug, WPB chairman, told the Senate Small Business Committee last week. This committee and other congressional groups could be more helpful if they urged small manufacturers to snap out of their inertia and get busy, he declared.

While Mr. Krug did not say so definitely, he evidently had in mind a sharp criticism of the WPB which had been expressed earlier in these hearings by the committee's executive secretary, Dr. Dewey Anderson.

"Reports received by the Senate Small Business Committee indicate a fear on the part of small producers throughout the country that 'open-ending' of CMP which is scheduled for July 1, 1945, will place them in an unfavorable position as far as materials supplies are concerned," Dr. Anderson told the committee. "They express the feeling that large producers will be able to purchase copper, steel and aluminum and indicate that it is possible that big business may be able to exclude smaller manufacturers from basic metals and parts suppliers' delivery schedules."

The WPB, said Mr. Krug, has a good program for helping small manufacturers reconvert, and results will begin to show impressively around the middle or latter part of the third quarter. But concerns with annual sales less than $200,000 number some 145,000, and it is impossible to wet-nurse that many, he said. The best the WPB can do, said Mr. Krug, is provide an overall framework.

Main reliance of the WPB for an easier materials supply situation in the coming months is placed on the promised cutbacks in the military procurement programs. Production for military purposes is down 7 per cent in the second quarter as compared with the first quarter of 1945. It will show a reduction of 20 per cent in third quarter and a little more than 30 per cent in the fourth quarter. In the first quarter of 1946 war production will be 36 per cent below first quarter of 1945, while in second quarter of 1946 it will be 38 per cent less.

On the basis of this picture the WPB believes that no more than half of the original 600 materials and components control orders will have to be retained while the Japanese war lasts.

Instead of hurting small consumers, the very opposite is the effect of those controls the WPB now has in force, said Mr. Krug. The steel controls, for example, limit the tonnage which the big consuming industries—such as the automobile, construction machinery and container industries—may use.

In addition, WPB plans to expand production of the materials and components which are in short supply. Mr. Krug referred to steel: "Now that we again are increasing steel production, we have a different product mix intended to take care of reconversion on top of war requirements. For instance, we now are producing proportionately more sheet and strip than plate. We are also improving inventory controls to prevent big consumers from pre-empting materials."

The steel sheet and strip supply will be materially easier soon, went on Mr. Krug. "We expect 300,000 tons of sheet and strip to be available in the third quarter—toward the middle or latter part of the quarter—unless hot weather or labor troubles cut output. We figure that around 200,000 tons will be available for other than automobile construction in the third quarter. Fourth quarter supplies of sheet and strip should be much larger for that is the low seasonal period in requirements for food cans."

Mr. Krug stresses the importance of maintaining steel stocks in warehouses so as to keep small consumers supplied.

Warehouse stocks of steel totaled 1,322,000 tons as of March 31, 1945,

CAR QUOTAS RAISED

Production quotas for passenger car manufacturers for the next nine months have been raised to 619,018 units, an increase of about 10 per cent over those announced several weeks ago by the War Production Board. Manufacture of 241,916 cars will be permitted in the last six months of this year and 449,102 in the first quarter of 1946. Last half quotas for individual builders are: General Motors Corp., 95,096; Chrysler Corp., 49,635; Ford Motor Co., 39,910; Studebaker Corp., 9275; Hudson Motor Car Co., Packard Motor Car Co., Nash-Kelvinator Corp., Willys-Overland Motors Inc., Graham-Paige Motor Corp. and Crosley Corp., 8000 each.

For the first quarter of 1946 quotas are: General Motors, 190,192; Chrysler, 99,270; Ford, 79,820; Studebaker, 18,550; Hudson, 13,602; Packard, 12,118; Nash, 11,550; Willys-Overland, Graham-Paige and Crosley, 8000 each.

compared with 1,404,000 as of Dec. 31, 1944. Brass stocks totaled 12 million pounds March 31 and may reach 17,500,000 by Sept. 30.

Steel warehouses may be expected to distribute their stocks (after war requirements have been met) with fairness among their many customers in order to expedite reconversion processes, Walter S. Doxsey, president, American Steel Warehouse Association, Cleveland, told the committee.

"Because in numbers and volume of business the small manufacturers and fabricators normally constitute the principal customers of warehouses there is little likelihood that these steel distributors will sell large quantities from their stocks to their large customers on unrated orders, thus quickly depleting their inventories with little or no hope of equally rapid replacements," Mr. Doxsey said.

Unrated orders for steel, Mr. Krug said, should begin to be shipped right after July 1.

The supply of fractional horsepower motors, bearings and other components no longer will be bottlenecks in the very near future; the big cutbacks in airplane and ship production will take care of that situation.

Plants producing over $50,000 per quarter will be able to obtain priorities assistance for bottleneck items under the terms of Priorities Regulation 28, to be issued soon, Mr. Krug said. He warned that only bottleneck items could be made eligible for such assistance, however.

Court Upholds Union in Antitrust Decision

The United States Supreme Court last week ruled that labor unions may not be sued under the antitrust laws for action which resulted in destruction of an employer's business. In a 5-to-4 decision the majority opinion, by Mr. Justice Black, held the Brotherhood of Transportation Workers was within its rights in refusing to negotiate with a Philadelphia trucking company and to refuse to admit employes of the trucking company to the union, thereby putting the company out of business.

In a dissenting opinion, Mr. Justice Jackson said the majority decision permits the union "the same abritrary dominations over the economic sphere which they control that labor so long, so bitterly and so rightly asserted should belong to no man."

In another decision involving an agreement between New York electrical workers and a group of New York electrical manufacturers preventing the installation and use of electrical equipment made outside New York, the court held such a pact was in violation of the antitrust laws because the union had conspired with a group of manufacturers in restraint of trade.

Senate Offered Labor Peace Plan

Labor disputes spread as reconversion starts. Observers pessimistic over outlook as further cutbacks and layoffs develop. Peace plan provides for compulsory arbitration

READJUSTMENT from all-out war production to partial reconversion, with its accompanying readjustment in work schedules, some layoffs and other changes necessitated by the transition is bringing with it an increase in labor disputes.

On the heels of strikes in the steel production centers of Pittsburgh, Birmingham, Detroit and Youngstown, new disputes broke out last week in Akron where some 20,000 employes of the Goodyear Tire & Rubber Co. struck, at Chicago, where truck drivers are in a wage dispute with the War Labor Board and where troops were ordered to take over the lines for the Office of Defense Transportation, in West Coast shipyards (p. 88) and in many other centers where stoppages for various causes, including union jurisdictional disputes (p. 109), occurred.

More Widespread Disputes Expected

These are believed to be only the harbinger of more widespread disputes expected to accompany the more drastic cutbacks in employment to come.

Cognizance that the labor situation likely will become much worse before it gets better was taken by a group of private citizens and three United States senators who last week offered the Senate a broad plan for industrial peace.

This group, representing the public and consulting with neither management nor labor, titled their plan a Federal Industrial Relations Act. It proposes to:

Set up a new Federal Labor Relations Board of five members which would have charge of all federal conciliation and mediation in labor disputes and which would replace the National Labor Relations Board, the War Labor Board and the Conciliation Division of the Department of Labor.

Establish a new unfair labor practice tribunal of three to decide all complaints of unfair labor practices by unions or management.

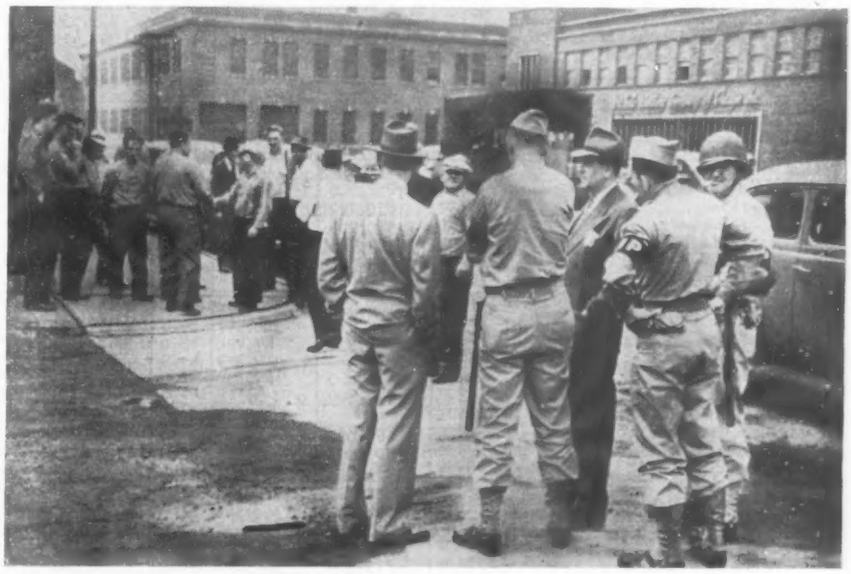
Divorce the settlement of labor controversies from punishment for unfair labor practices, eliminate the Smith-Connally War Labor Disputes Act; tighten the present definition of interstate commerce to exclude purely local disputes.

Produce compulsory arbitration for disputes of national importance, to be used after mediation fails.

Rewrite the closed shop provisions of the Wagner Act to require that the union with such a privilege must clearly represent more than a majority of employes involved and cannot bar or expel any qualified person from membership.

Leave railroad labor under the Railway Labor Act, which has operated successfully through two decades.

Senators sponsoring the program include Harold H. Burton (Rep., O.), Joseph H. Ball (Rep., Minn.) and Carl Hatch (Dem., N. Mex.).



Truck drivers, in background, loitering outside a Chicago trucking company retreat upon arrival of military police as troops move in to enforce a Presidential order placing Chicago truck lines under control of the Office of Defense Transportation. NEA photo

Sweden Seeking Iron Here with European Supply Sources Cut Off

From 50,000 to 100,000 tons reported on inquiry, most of it bessemer. Ore to be big factor in payment. Shipping space limited but may be made available through pool. Small lot inquiry for foundry iron from South America entertained

WHILE there is little assurance any business will develop in the near future, Swedish inquiry for pig iron continues to attract attention. With her outside supplies cut off from the Ruhr and certain other European points, Sweden is negotiating for anywhere from 50,000 to 100,000 tons, with purchases possibly to be handled through an organization there comparable in some respects to the American Iron and Steel Institute in this country.

Most of the iron specified by Sweden is bessemer.

Sweden usually exchanges ore for iron in her negotiations with outside European producers.

Shipping facilities have also been an important consideration. However, it is understood that ship space will be pooled.

Other foreign inquiry is coming principally from South America and is comprised of small lots, chiefly foundry iron.

Future of German Industry Hinges on Allied Policy

German industry is almost completely closed down and it will remain so pending a decision on policy by the Allied powers, according to press dispatches from Europe. Statement issued at headquarters of the American Fifteenth Army which occupies the Ruhr says:

"It is assumed that German industry will in the future again be productive under controls designed to prevent such German production from endangering world peace. Pending determination by the Allied Control Council of how this controlled production for peace will operate, Germany's economic activity will be kept tightly restricted."

The only types of plants allowed to operate in Germany are those whose products are wanted by the Allied armies or are considered essential to maintenance of "minimum standards of life for the German civilian population."

Every German manufacturer who wishes to reopen his plant must obtain a license from the occupying army. Often he is licensed to reopen only for a specific job.

The Krupp management, which asked permission to go back into production,

Finished Iron and Steel Made for Sale in April

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period APRIL - 1945

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production Net Tons	Current Month: Production Per cent of capacity	Current Month: Shipments (Net Tons) Total	Current Month: Shipments (Net Tons) To members of the industry for conversion into further finished products	To Date This Year: Production Net Tons	To Date This Year: Production Per cent of capacity	To Date This Year: Shipments (Net Tons) Total	To Date This Year: Shipments (Net Tons) To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	49	1	xxxx	xxxx	xxx	856,484	215,659	xxxx	xxx	3,104,410	762,147
Structural shapes (heavy)	11	2	9,580,550	258,133	36.0	273,090	xxxx	1,063,599	36.5	1,089,217	xxxx
Steel piling	3	3		25,546		24,855	xxxx	87,561		88,759	xxxx
Plates (sheared and universal)	27	4	17,841,320	675,599	46.0	668,717	40,359	3,007,477	51.2	2,956,520	187,099
Skelp	6	5	xxxx	xxxx	xxx	58,658	31,070	xxxx	xxx	250,307	147,513
Rails—Standard (over 60 lbs.)	4	6	3,669,000	169,244	56.1	173,377	xxxx	736,638	61.0	732,298	xxxx
—All other	5	7	512,000	16,450	39.0	15,199	xxxx	59,371	35.3	60,835	xxxx
Splice bars and tie plates	12	8	1,745,960	61,723	43.0	64,982	xxxx	253,088	44.1	260,949	xxxx
Track spikes	10	9	349,400	12,946	45.0	12,829	xxxx	51,263	44.6	53,013	xxxx
Hot Rolled Bars—Carbon	36	10	xxxx	789,357	xxx	599,538	90,850	2,988,259	xxx	2,318,365	361,736
—Reinforcing—New billet	13	11	xxxx	35,110	xxx	47,419	xxxx	194,890	xxx	199,114	xxxx
—Rerolled	13	12	xxxx	5,461	xxx	4,663	xxxx	22,478	xxx	25,097	xxxx
—Alloy	24	13	xxxx	269,182	xxx	195,612	23,611	1,078,025	xxx	787,503	95,856
—Total	46	14	22,381,700	1,099,110	59.7	847,232	114,461	4,283,652	58.2	3,330,079	457,592
Cold Finished Bars—Carbon	23	15	xxxx	156,930	xxx	158,072	xxxx	605,161	xxx	604,449	xxxx
—Alloy	24	16	xxxx	38,122	xxx	36,947	xxxx	154,112	xxx	142,695	xxxx
—Total	31	17	3,015,910	195,052	78.6	195,019	xxxx	759,273	76.5	747,144	xxxx
Tool steel bars	17	18	273,010	12,365	22.0	12,562	xxxx	47,716	53.1	48,089	xxxx
Pipe & Tubes—Butt weld	16	19	2,232,520	134,735	73.3	131,796	xxxx	504,892	68.8	483,074	xxxx
—Lap weld	9	20	830,200	50,873	74.5	52,151	xxxx	180,522	66.1	183,561	xxxx
—Electric weld	11	21	1,570,900	88,258	68.3	79,643	xxxx	350,854	67.9	306,943	xxxx
—Seamless	16	22	3,377,700	280,305	100.9	209,958	xxxx	1,049,912	94.5	835,509	xxxx
—Conduit (cap. & prod. incl. above)	7	23	xxxx	xxxx	xxx	7,004	xxxx	xxxx	xxx	29,132	xxxx
—Mech. tubing (cap. & prod. incl. above)	11	24	xxxx	xxxx	xxx	63,084	xxxx	xxxx	xxx	268,403	xxxx
Wire rods	27	25	7,266,670	387,650	64.8	113,434	35,701	1,543,984	64.6	434,252	141,821
Wire—Drawn	41	26	5,664,690	300,947	64.6	184,314	7,272	1,236,589	66.4	740,760	32,877
—Nails and staples	19	27	1,253,360	47,420	46.0	51,082	xxxx	200,377	48 6	201,489	xxxx
—Barbed and twisted	15	28	539,610	19,949	44.9	19,948	xxxx	80,036	45.1	78,755	xxxx
—Woven wire fence	16	29	1,113,860	29,330	32.0	29,994	xxxx	126,395	34.5	125,327	xxxx
—Bale ties	12	30	149,700	5,519	44.8	7,021	xxxx	23,837	48.4	26,308	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	53,844	880	xxxx	xxx	173,848	1,659
—Chemically treated	8	32	465,000	9,905	25.9	8,806	xxxx	42,248	27.6	37,695	xxxx
Tin and Terne Plate—Hot dipped	10	33	3,793,850	132,269	48.8	198,066	xxxx	660,935	53.0	726,712	xxxx
—Electrolytic	10	34	2,231,850	63,894	34.8	86,693	xxxx	272,628	37.1	291,104	xxxx
Sheets—Hot rolled	29	35	19,197,320	1,123,358	71.1	598,478	44,754	4,429,840	70.2	2,289,507	145,024
—Cold rolled	12	36	7,131,460	360,343	61.4	213,180	xxxx	1,448,469	61.8	839,922	xxxx
—Galvanized	16	37	2,915,130	143,445	59.8	150,190	xxxx	587,933	61.3	584,551	xxxx
Strip—Hot rolled	24	38	7,055,390	223,546	38.5	146,948	25,566	917,669	39.5	578,101	93,421
—Cold rolled	35	39	3,119,850	118,048	46.0	117,600	xxxx	482,196	47.0	455,085	xxxx
Wheels (car, rolled steel)	5	40	319,400	26,744	101.8	26,649	xxxx	99,398	94.6	98,406	xxxx
Axles	6	41	408,170	13,158	39.2	13,184	xxxx	48,524	36.1	48,326	xxxx
All other	5	42	190,490	3,842	24.5	3,715	xxxx	15,956	25.5	14,996	xxxx
TOTAL STEEL PRODUCTS	152	43	xxxx	xxxx	xxx	5,769,786	515,722	xxxx	xxx	22,573,382	1,969,153
Effective steel finishing capacity	152	44	67,310,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	152	45	xxxx	xxxx	xxx	94.9 %	xxxx	xxxx	xxx	93.1%	xxxx

was told to give more specific details about what peacetime goods it can make.

Employes Get Larger Share Of Steel Industry Dollar

Payrolls last year took a larger share than ever before of each dollar received by steel companies from the sale of their products, according to the American Iron and Steel Institute. The employes' share of the dollar was 40½ cents, compared with 40 cents in 1943, 35 cents in 1940 and 35½ cents in 1929.

The portions of the dollar available for dividends, re-investment, and depletion and depreciation remained low last year.

Chiefly because of lower earnings, the industry's tax cost for each sales dollar declined to 7 cents last year from 9 cents in 1943. Despite the decline, the 1944 tax cost still remained substantially above the level of the years preceding the start of the war. In 1940 about 6½ cents out of each sales dollar went for taxes, in 1939 the industry paid 5½ cents for taxes out of each dollar and in 1929 the industry paid only 4 cents for the purpose.

The tax cost computation for 1944 was exclusive of postwar refunds provided under the federal excess profits tax law. In this respect the 7 cent figure is not strictly comparable with the 1943 figure of 9 cents, for in 1943 the amount of the postwar refund could not be excluded from the tax figures as reported.

After paying taxes, payrolls and all other expenses in 1944, only 2 cents of the sales dollar remained for stockholders' dividends. After paying the stockholders only ½ cent remained out of each dollar to be left in the business as a cushion for the future. Both these amounts were indentical with the sums remaining for the same purposes in 1943. The 2 cents going for dividends was in sharp contrast with the 4 cents availabyle for dividend in 1940, the 5 cents available in 1937 and the 6½ cents available for the purpose in 1929.

Whereas only 2½ cents remained for dividends and surpluses last year, in 1940 stockholders and company surpluses received 8 cents out of the sales dollar.

Depletion and depreciation took 4½ cents out of the industry's sales dollar in 1944, exactly the same amount as in 1943, but smaller than the amount set aside in the prewar years 1939 and 1940, when 5½ cents and 5 cents went respectively to meet such charges.

The cost of sales and general administrative expenses was computed last year for the first time. This amounted to 2½ cents of each sales dollar.

All other operating expenses in 1944 claimed 42½ cents out of each sales dollar. This compared with 43½ cents in 1943, 45 cents in 1939 and 38½ cents in 1929.

Peak Production Year Poorest of Wartime Era for Steel Profits

STEEL companies earned less money in 1944, greatest steel production year on record, than they did in any preceding war year, and far less than they earned in a good peacetime year like 1937, the American Iron and Steel Institute reported last week.

Stockholders received in dividends only about 80 per cent as much as they got in 1937, and only about half as much as in 1929.

Last year, companies accounting for nearly 90 per cent of total shipments of finished steel products, had a combined net income of $178,250,550 after meeting all charges but before paying dividends. That was a decline of about 5 per cent from the total of $188,591,832 earned by the same companies in 1943. Both figures include earnings from certain non-steelmaking activities, such as mining, transportation, shipbuilding and other activities.

In 1937, when steel output was 37 per cent less than in 1944, earnings of a similar group of companies were almost 30 per cent higher, amounting to about $230,000,000.

The companies earned last year about 4.7 per cent on investment, lowest of any war year and considerably below 1937. In 1941 earnings were highest for the war period, 8.1 per cent on investment, which compared with 6.2 per cent in 1937. In 1942, the return was 5.6 per cent while for 1943 it amounted to 5.1 per cent.

A total of $118,953,000 in cash dividends was paid last year to the nearly half a million owners of the companies, about $23,000,000 or 16 per cent less than in 1943. In 1937, dividends exceeded $151,000,000.

Dividends paid to stockholders last year represented 4½ cents for every dollar paid to employes. In 1943 stockholders received 5½ cents in dividends per dollar of payrolls disbursed, and in 1937 they got 13½ cents per dollar of payrolls.

A total of $6,613,461,000 in gross income was received by the steel companies in 1944, including income from non-steelmaking activities. That represented a decline of about $33,000,000 from 1943 income.

Payrolls (including those disbursed for non-steelmaking operations) increased by $58,000,000 and the cost of materials and other expenses rose $17,000,000. Payrolls amounted to $2,640,954,000 in 1944. A decline of $3,000,000 in depreciation and depletion charges was more than offset by a $19,000,000 rise in amortization of emergency facilities built during the war

Taxes were lower in 1944 than in 1943 chiefly because of reduced income and profits. For 1944, the total tax bill of the companies was $464,997,000 including social security taxes, a decline of $110,000,000 from the 1943 total.

TRANSITION TOPICS

SURPLUS PROPERTY— Senate Military Affairs subcommittee prods Surplus Property Board on disposal policy. Criticizes failure to submit report on government-owned iron and steel plants. See page 79.

RECONVERSION— War Production Board says program will aid small business but warns little manufacturers to help themselves. See page 84.

LABOR— Adjustments to partial reconversion bringing increase in labor disputes. Senate receives broad plan to aid industrial peace. See page 85.

TECHNOLOGICAL ADVANCES— Equivalent of ten years of technological progress encompassed in four years under war pressure to bring vast improvements in steels for civilian products. See page 116.

MACHINE TOOLS— Survey by editors of STEEL presents views of hundreds of industrial plants on machine tools and machining methods, what tools industry now has and what it intends to buy. See insert opposite page 88.

BUG BOMBS— Peacetime market being studied for steel "bombs" used by armed forces to spray insecticides. See page 118.

TOOLING WAYS— Accurate substitute for tooling dock in small-scale positioning operations readily adaptable to assembly tooling of automobiles as well as light airplanes. See page 120.

Ship Repair Work Piling On Coast

Thousands of additional skilled workers needed. New labor recruiting program effected. New construction is declining

Lake Washington Shipyard workers walked out of the yards at Kirkland, Wash., in protest against the suspension of several fellow workers for "whistle jumping." Only a few of the yard's 2500 employes reported for work on the following day. NEA photo

SAN FRANCISCO

INDICATIONS are that recent steps to ease manpower shortage in ship repair yards here will be at least partially helpful. During the next few months approximately 20,000 men will be needed for repair work, and most of them will have to have above average proficiency.

Under the new labor recruiting program evolved by War Manpower Commission and Navy officials, a No. 1 national priority on ship repairs has been established in the San Francisco area. In addition, employment rules have been changed to accomplish the following:

Any journeyman machinist, electrician or sheet metal worker not now directly employed in repair of ships in either government, or private yards or by subcontractors working directly on ship repair, may immediately apply for and receive a WMC work clearance certificate, provided the worker will accept an immediate referral to ship repair work in the area.

Under this program a worker must transfer to a ship repair yard within 48 hours after receiving the certificate of availability for ship repair.

Repair Work Still Increasing

Commenting on this ruling, Sam Kagel, WMC director for northern California, said this amendment to the labor stabilization program is the first specific change in the program since it was adopted. He pointed out that repair work constitutes the most critical job of the war. The June repair work was double that of last November and all signs indicate it will continue to increase.

No compulsion is planned to force workers from private into government yards. The "bottleneck workers," Mr. Kagel said, must come from private shipyards on a voluntary basis. He believes there are enough skilled men available if they can be persuaded to shift to repair work.

Although, at this writing, the new regulation is too young to show what effect it will have on labor recruitment, manpower officials are optimistic that it will bring an increasing number of workers into repair yards. Meantime, campaigns will be continued to influence the transition and keep before the public the emergency which now exists.

One stumbling block to the West Coast's ship repair program is wage differentials. One large government yard in this area operates under civil service rules and wage rates are lower than nearby private yards.

In addition, wage rates in the San Francisco area are 11.6 per cent higher than in southern California, creating a difficulty for the southern yards to get workers in competition with the northern installations. Although formal demands have been made to government agencies concerned to equalize these differentials, up to now the appeals have been refused.

Within another three months, prospects are that the ship repair labor shortage may get its biggest relief when widespread layoffs occur in yards currently working on new ship construction. Big-scale dismissals are scheduled for August and September, and several thousand skilled workers among the many thousands of total employes to be released will help swell the ranks of the repair men.

Meanwhile, the shipyards continue to work themselves out of business. During the month of May, 25 vessels were delivered by yards in the San Francisco area and 16 in the Los Angeles area. Portland yards delivered eleven vessels.

In all, Pacific Coast shipyards in May turned out 47.6 per cent of the ships delivered from Maritime Commission yards all over the nation.

The deliveries were divided as follows:

Three coastal cargo ships and one military type vessel from two Kaiser Richmond yards.

Five tankers from Marinship Corp.

Four ships from Moore Dry Dock Co.

Twelve Victory cargo vessels from Permanente Metals Corp. (Kaiser).

Eight Victory cargo ships from California Shipbuilding Corp.

Eight coastal cargo carriers from Consolidated Steel Corp.

Three T-2 tankers from Kaiser's Swan Island yard at Portland.

Eight Victory ships from Oregon Shipbuilding Corp.

Seek To Speed Up Fontana Steel Mill Conversion

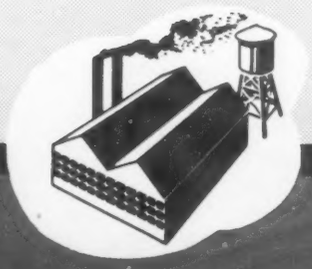
Drastic curtailment of war steel production at the Kaiser Co. mill at Fontana has prompted the Steel Committee of the Western States Council to urge John Snyder, administrator, Federal Loan Agency, Washington, to expedite as much as possible negotiations that will aid the plant in pushing alterations for civilian production.

The communication to Mr. Snyder was signed by Kenneth T. Norris, chairman of the committee, who said he had been informed that the Kaiser Co. has submitted a refinancing plan to RFC.

A SPECIAL REPORT TO INDUSTRY ON

MACHINE TOOLS

A study by the editors of STEEL covering . . . features industry wants in postwar machine tools . . . expected purchases of both new and surplus government-owned machine tools . . . trends in tooling and machining methods.



PENTON BUILDING **STEEL** CLEVELAND 13, OHIO

June 25, 1945

Industry answers these q

As part of a continuing series of studies on problems affecting the metalworking industries, the editors of STEEL present on the following pages the composite views of 2358 plants on machine tools and machining methods for the guidance of machine tool users, machine tool builders and government agencies in formulating future plans and policies.

These 2358 plants, because of their diversification by size and types of operation, adequately reflect the opinion of over 11,000 plants in the United States performing machining operations on a production basis.

Since the outbreak of World War II in 1939, revolutionary developments in machining practice, such as superspeed milling, negative rake machining and machining to finer finishes and tolerances, have accelerated machine tool obsolescence far beyond its normal rate. At the same time, two and three shift operation by inexperienced people has accentuated wear and tear on present machines.

Consequently, metalworking plants now have definite expectations in regard to frame, way and slide construction; methods of drive, feed and control; lubricating and cooling systems; vibration elimination; methods of holding the work; lighting; chip disposal; tooling and other similar factors.

Plans also have been made by industry on purchases of postwar-model and surplus government-owned machine tools; the rebuilding of machines now owned; and special-purpose machines. In addition, the overall effects of a comprehensive trade-in program on replacement of old machines have been studied.

The charts and text which follow provide the metalworking industry as a whole with its own answers to many of the questions it has been asking about itself. While only the over-all figures are presented here, detailed breakdowns, by special arrangement, are available for those wishing to analyze the study more carefully. Primarily, these breakdowns are by plant size on the basis of employment, by geographical areas and by industrial classifications.

se questions on Machine Tools and Machining Methods

1. *What specific types of machine tools does industry now have and intend to buy?*

2. *Does industry expect to buy postwar-model machine tools? Surplus government-owned machines? Rebuild present models?*

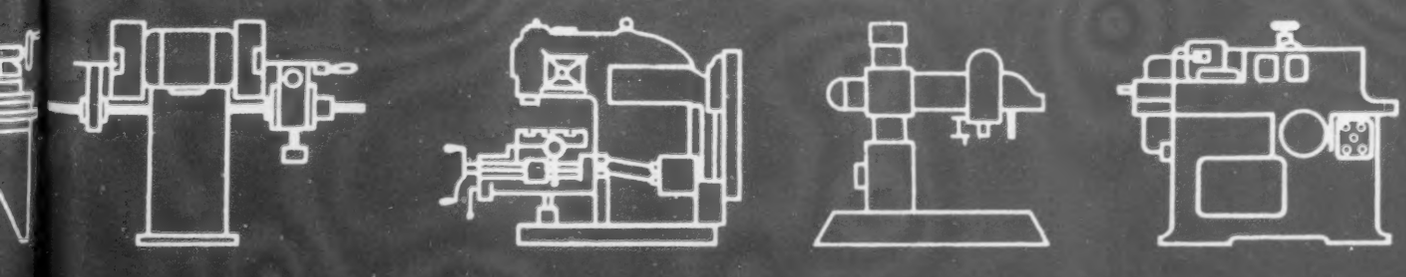
3. *Would a more comprehensive trade-in program lead to greater replacement of older machines?*

4. *Will more special-purpose machines be used?*

5. *What tools: Carbide? Cast Stellite-type? High-speed steel?*

6. *What about superspeed milling? Negative rake machining? Machining to finer finishes and tolerances?*

7. *What features does industry want in its postwar machine tools?*

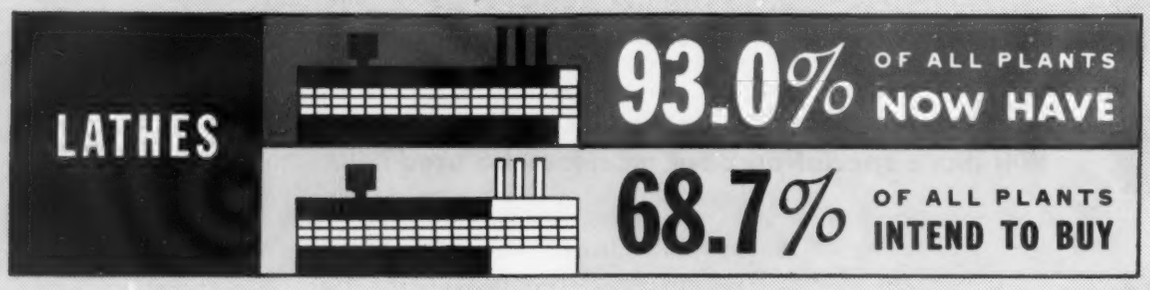


1 Machine Tools Now in Us

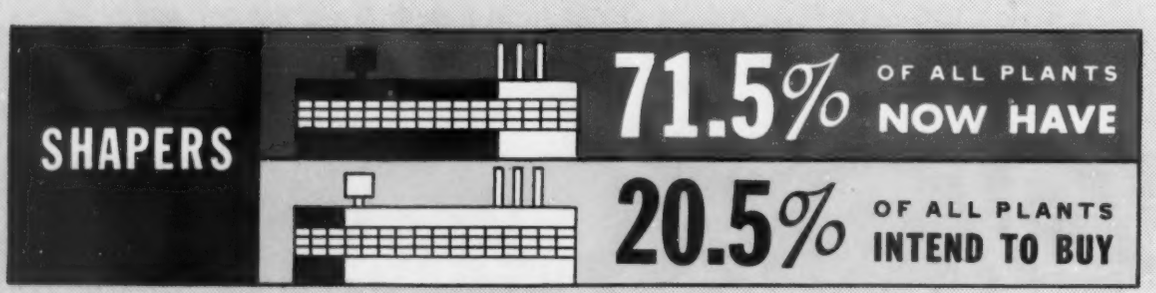
THE following charts show the types of machine tools that metalworking plants now have and those they intend to buy. For example, 93 per cent of all plants with production machine shops own some type of lathe and 68.7 per cent of all plants plan to buy; 81.7 per cent own engine lathes and 36.3 per cent will buy machines of this type. Note that 59.9 per cent of all plants have turret lathes and 36.3 also plan purchases.

Careful study of the figures reveals possible trends. It will be observed, for instance, that the number of plants with centerless grinders and automatic chucking machines is almost matched by the number planning new purchases. In the case of gear shavers and die sinking machines, more plants intend to purchase than now have them.

While there is considerable variance in the figures for the "now have" and "intend to buy" groups as applied to specific machines, there can be little doubt that the metalworking industries are planning further expansion and modernization in their machining facilities as they return to the manufacture of peacetime products—in many cases entirely new products.

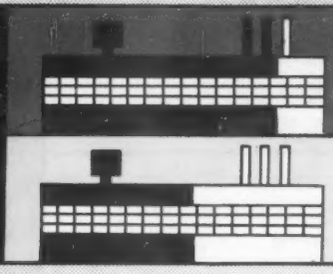


BY TYPE OF LATHE	NOW HAVE	INTEND TO BUY
Automatic Chucking Machines	14.8	13.4
Engine	81.7	36.3
Multiple-spindle Automatics	15.2	11.9
Railroad	.96	1.4
Roll Turning	2.7	1.9
Single Spindle Automatics	20.6	12.6
Toolroom	58.7	27.1
Turret (Including Vertical)	59.9	36.3



n Use and Expected Purchases

BORING AND DRILLING

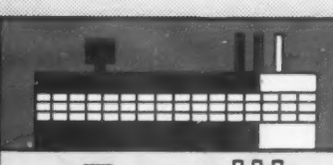


83.3% OF ALL PLANTS **NOW HAVE**

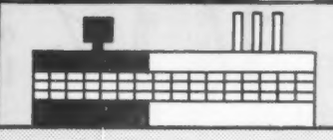
54.6% OF ALL PLANTS **INTEND TO BUY**

BY TYPE OF BORING & DRILLING MACHINE	NOW HAVE	INTEND TO BUY
Horizontal	39.2	19.3
Jig	19.2	13.4
Multiple Spindle	34.7	16.6
Radial	45.2	21.9
Vertical	59.7	18.1

MILLING



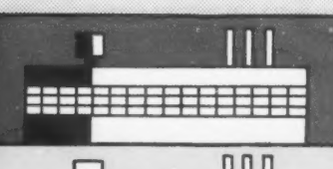
79.3% OF ALL PLANTS **NOW HAVE**



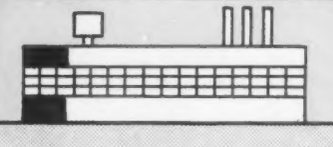
42.4% OF ALL PLANTS **INTEND TO BUY**

BY TYPE OF MILLING MACHINE	NOW HAVE	INTEND TO BUY
Knee-type	41.7	12.8
Multiple Spindle	6.0	3.6
Production	32.6	12.8
Tracer Controlled	4.2	4.9
Universal	56.9	25.1

BROACHING



23.6% OF ALL PLANTS **NOW HAVE**



16.8% OF ALL PLANTS **INTEND TO BUY**

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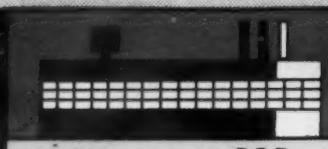
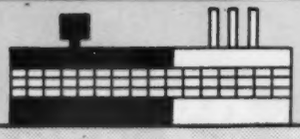
MACHINE TOOLS NOW IN USE AN

GRINDERS



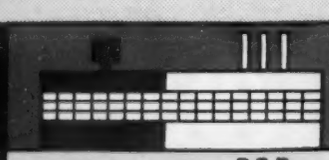
83.1% OF ALL PLANTS NOW HAVE



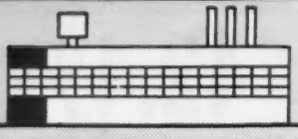
57.1% OF ALL PLANTS INTEND TO BUY

BY TYPE OF GRINDER	NOW HAVE	INTEND TO BUY
Abrasive Belt	33.2	10.5
Centerless	15.6	13.3
Honing and Lapping	15.8	8.1
Internal	30.9	13.8
Polishing and Buffing	30.2	8.5
Roll	7.5	3.4
Tool	54.4	16.4
Surface	56.8	23.2
Thread	9.0	8.2
Universal	43.7	17.3

PLANERS



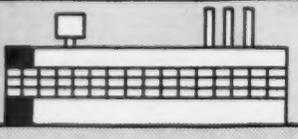
45.6% OF ALL PLANTS NOW HAVE



14.1% OF ALL PLANTS INTEND TO BUY

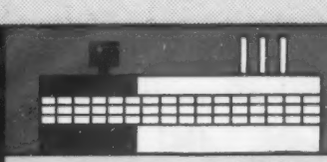
DIE SINKING

6.9% OF ALL PLANTS NOW HAVE

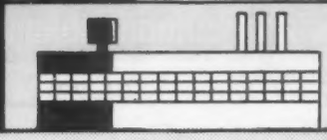


7.9% OF ALL PLANTS INTEND TO BUY

GEAR MAKING



33.2% OF ALL PLANTS NOW HAVE

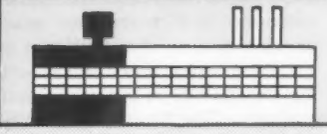


27.0% OF ALL PLANTS INTEND TO BUY

BY TYPE OF GEAR MAKING MACHINE	NOW HAVE	INTEND TO BUY
Cutters	16.9	8.4
Grinders	6.5	5.3
Hobbers	17.4	10.1
Shapers	16.7	9.6
Shavers	2.7	5.2

METAL CUTOFF

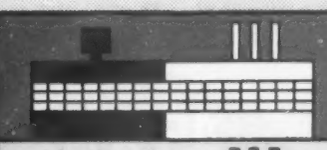
84.8% OF ALL PLANTS NOW HAVE



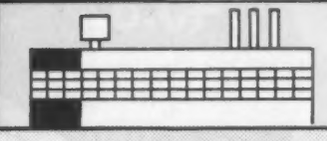
33.6% OF ALL PLANTS INTEND TO BUY

BY TYPE OF CUTOFF MACHINE	NOW HAVE	INTEND TO BUY
Abrasive Cutoff	26.3	12.1
Band Saws	50.3	12.6
Circular Saws	24.9	4.2
Power Hack Saws	63.7	12.3

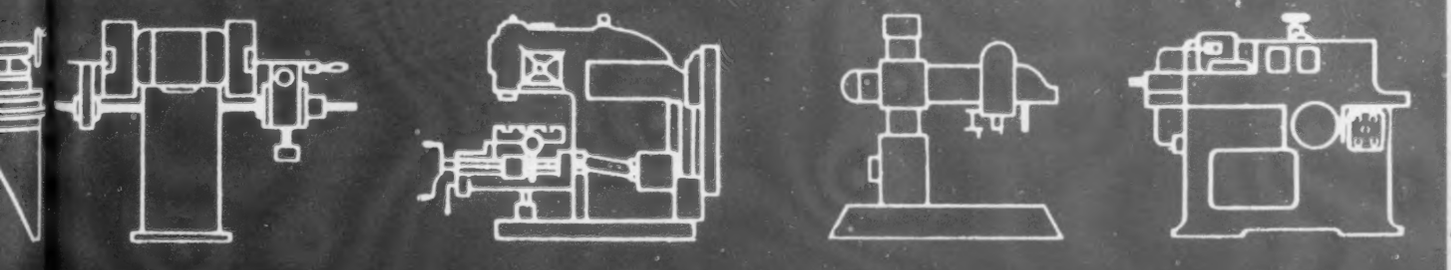
TAPPING AND THREADING



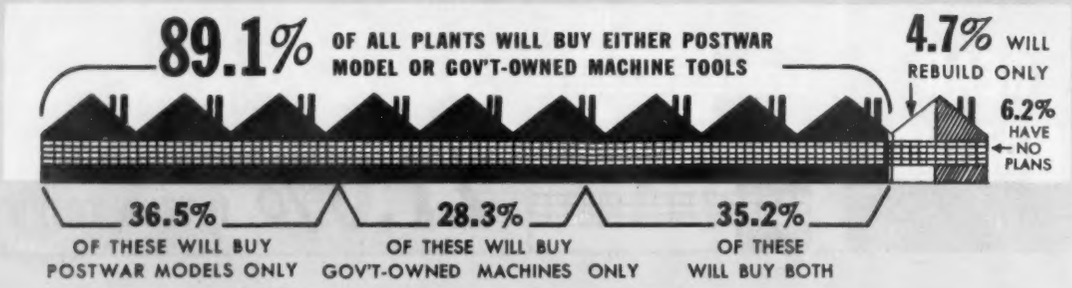
45.8% OF ALL PLANTS NOW HAVE



18.8% OF ALL PLANTS INTEND TO BUY



2 New or Surplus Machine Tools?


89.1% OF ALL PLANTS WILL BUY EITHER POSTWAR MODEL OR GOV'T-OWNED MACHINE TOOLS
4.7% WILL REBUILD ONLY
6.2% HAVE NO PLANS
36.5% OF THESE WILL BUY POSTWAR MODELS ONLY
28.3% OF THESE WILL BUY GOV'T-OWNED MACHINES ONLY
35.2% OF THESE WILL BUY BOTH

Prospects for still greater improvements in machining methods have generated considerable interest in postwar-model machine tools, as evidenced by the fact that 71.7 per cent of the plants reporting will buy some postwar models. Larger plants show more interest than the smaller ones in buying more efficient, new-model machine tools.

3 Industry's Reaction to a "Trade-In" Program

Experience after World War I proved that comprehensive trade-in plans can help both machine tool users and builder if (1) adequate but not fantastic allowances are made; (2) scrapping of obsolete and worn out machines is definitely carried out, so they will not come back into use; (3) machines meriting rejuvenation are rebuilt by competent companies, including the original makers. The figures at the left indicate that an overwhelming number of machine tool users would favor more extensive replacements of old tools if builders or dealers offered a more comprehensive trade-in program.

4 Outlook for "Specially-Built" Machines

Machine tool users confirm the opinion that there will be a lively race between ingeniously tooled standard machines and machines built from the ground up to machine specific parts. Labor conditions as well as the number of parts to be machined and the stability of their design will have to be weighed carefully in coming to a decision. As might be expected, nearly two-thirds of the plants employing over 1000 workers on large-scale production work expect to use special-purpose machines. This is well above the average of 45.8 per cent for all plants.

5 Trends in TOOLING...

Sensational performance of the sintered carbides plus improvements in high speed steel and cast Stellite-type tools are causing machine tool users to "want to see all three" before finally selecting one type. Even then, they may utilize two or three of the materials on a given job, each where each is best suited. Carbide tooling finds most favor among the larger plants, the range being from 91.3 per cent for those employing over 1000 down to 68.8 per cent for those with less than 25 workers. Respective figures for cast Stellite-type tools are 30.3 and 16.4. High speed steel tooling is in relatively higher favor among the smaller plants than the larger ones, the range being from 53.2 per cent for those with less than 25 workers to 44.6 per cent for plants with over 1000.

79.0% OF ALL PLANTS — PLAN GREATER USE OF **CARBIDE TOOLING**

48.5% OF ALL PLANTS — PLAN GREATER USE OF **HIGH-SPEED STEEL TOOLING**

21.4% OF ALL PLANTS — PLAN GREATER USE OF **CAST STELLITE-TYPE TOOLING**

6 Trends in METHODS...

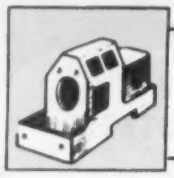
Fast removal of metal now goes hand-in-hand with tightened limits of accuracy and finish. Machine tool users, more and more, are expecting machines to provide fine finishes at "roughing" speeds. In some cases, these expectations are already being fulfilled. Superspeed milling will be used more extensively by 62.1 per cent of the plants employing over 1000 workers, ranging down to 28 per cent for those with less than 25 workers. Respective figures for negative rake machining and machining to finer finishes and closer tolerances are 57.4 and 17.6 and 78.5 and 62.4. Practically all plants are interested in finer finishes, such as are now being achieved not only by honing and lapping but also by improved methods of grinding and single-point tool machining.

69.1% OF ALL PLANTS — PLAN GREATER USE OF **MACHINING TO FINER FINISHES AND CLOSER TOLERANCES**

40.2% OF ALL PLANTS — PLAN GREATER USE OF **SUPERSPEED MILLING**

29.0% OF ALL PLANTS — PLAN GREATER USE OF **NEGATIVE RAKE MACHINING**

7 How Industry Views t



BASES:

42.9% PREFER CAST BASES

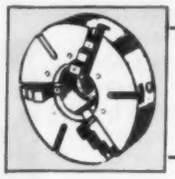
25.8% PREFER WELDED BASES

Improvements in welding techniques have been accompanied by development of better ferrous alloys and foundry practice. Therefore, careful engineering considerations now are involved in choosing weldments or castings. Among plants employing over 1000 workers, cast bases are preferred by 48.1 per cent, welded bases by 26.7 per cent.

CENTRALIZED LUBRICATION

85.6% WANT THIS FEATURE

Centralized lubrication on many machine tools already is so well established that the principal questions now are the extent to which it should be used and the systems to be employed. Careful specification of lubricants for these systems also is highly important. Although the average of 85.6 per cent for all plants wanting centralized lubrication is high, the figure for plants with over 500 workers is still higher at nearly 94 per cent.



CHUCKS:

39.0% FAVOR AIR OPERATED

32.7% FAVOR MECHANICAL

29.3% FAVOR HYDRAULIC

21.2% FAVOR MAGNETIC

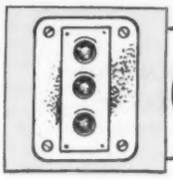
There is a growing realization that sensationally fast machining methods are not advantageous if savings in time are largely offset by inefficient methods of loading and unloading work. The operator fatigue factor also is being increasingly considered. The figures for all plants shown in the chart compare with the following for plants with over 1000 employes: Air operated 47.1, hydraulic 42.7, magnetic 25.7 and mechanical 31.1.

CHIP DISPOSAL SYSTEM

62.4%
WANT IT

While chip disposal systems may not be vital on jobbing tools and lathes which do not involve mass removal of metal, they are tremendously important when super-speed machining is involved. Machines for rapid removal of metal in many cases undoubtedly will be re-designed to embody built-in chip disposal mechanisms. Eight out of 10 plants among larger companies want such systems.

these Machine Tool Features



CONTROLS:

48.9% WANT FULL ELECTRIC

24.4% WANT ELECTRONIC

Electrical manufacturers for many years have been working closely with machine tool builders to develop control apparatus especially suited to machine shop use. Electronics already have been applied to a number of machines for providing stepless variable speeds. Nearly 4 out of 10 larger plants want electronic controls, 6 out of 10 full electric.

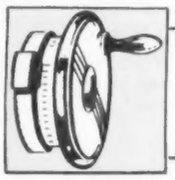
DRIVES:

69.4% FAVOR V-BELT

27.9% FAVOR GEAR

9.6% FAVOR CHAIN

High spindle speeds demanded by carbide tooling have brought about many changes in the engineering of machine tool drives. Older methods have been revised and improved and new methods have been introduced. With a choice of drives available, the type may be selected which will give maximum results with the particular type of tooling involved.



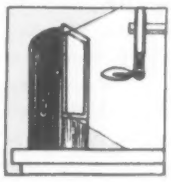
FEEDS:

54.4% PREFER HYDRAULIC

40.1% PREFER MECHANICAL

Whatever the preference as to type of feeds may be, it is a fact that developments such as superspeed milling now demand as many feet per minute as was formerly required in terms of inches. Increased power, elimination of backlash and freedom from pulsation also are expected, all of which have called for re-engineering of machine tool feeds.

BUILT-IN LIGHTING



66.8%
WANT IT

New types of bulbs and tubes, shatterproof glass and plastics for shields and even light-conducting plastics are receiving active consideration in solving the problem of providing better illumination of machine work areas. Built-in lights have the approval of the majority of all plants and in some industries, such as automotive, the percentage is even higher.

CONTINUED NEXT PAGE

VIEWS ON FEATURES... Continued

79.4% WANT

HARDENED AND GROUND WAYS—Metallurgical improvements, both of castings and of steel, combined with new methods of heat treating, lubricating and "wiping", make selection of types of ways a matter for careful analysis of conditions involved. Accelerated wear testing plays an important role in determining working efficiency and surface durability of various combinations of metals in sliding contact.

67.2% WANT

COLORS CONTRIBUTING TO SAFETY AND LIGHTING OF WORK AREAS—Most machine tool builders use the standard machine tool gray sponsored by the National Tool Builders Association. However, projects carried out by a number of machine tool users in co-operation with paint manufacturers show remarkable results in favor of brighter colors as a means of improving visibility of tools, work and controls.

63.8% WANT

HEAVIER BASES, LARGER MOTORS AND FLYWHEELS FOR HIGH SPEED MACHINING—Rule-of-thumb design in machine tool frames and in powering machine tools has given way to real engineering based upon experimental data as well as mathematics. This applies also to location and weight of flywheels, which will be built into many postwar machine tools—milling machines in particular.

80.0% WANT

MORE ACCESSIBLE HAND LEVERS AND OTHER CONTROLS Clinics held by leading machine tool users emphasize the need for more careful "tailoring" of machine tools to "fit" men (and women) operators. In buying machine tools in the future, this tailoring will be investigated just as carefully as other features. Among the larger plants, 9 out of 10 want more accessible controls.

69.7% WANT

MORE ACCESSIBLE MOTORS, HYDRAULIC SYSTEMS, ETC. Machine tool users have pointed out shortcomings in placement of electrical and hydraulic units from the service point of view. Among all plants, nearly 7 out of 10 feel that a happy medium must be struck between "streamlining" and "get-at-ability" with care taken to make unavoidably buried units long-lived and service free.

20.7% WANT

REFRIGERATING UNITS FOR CUTTING OILS—Those already in use are where accuracy demands uniform temperature during machining. Outstanding among these applications are many on thread grinders. With limits of accuracy generally tightening, increasing interest in coolant refrigeration is inevitable for use with production machines as evidenced by the reaction from machine tool users as shown in the adjoining chart.

60.6% WANT

VIBRATION-REDUCING MOUNTINGS—There are two schools of thought on machine vibration. One says: "Eliminate it at the source;" the other: "Damp it or segregate it." Both schools are being followed in overcoming vibration arising from increased machining speeds. Use of special mountings and dynamic balancing are "musts" in most machine tool plants.

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Printed in U. S. A.

PRIORITIES–ALLOCATIONS–PRICES

Summaries of revocations of and amendments to orders and regulations; official interpretations and directives, issued by War Production Board and Office of Price Administration

REVOCATIONS

VACUUM CLEANERS: Order L-18-b which prohibited production of domestic vacuum cleaners except under "spot authorization." The order had also restricted distribution of vacuum cleaners. (L-18-b)

ELECTRICAL APPLIANCES: Order L-65 which permitted limited production of certain types of commercial electric cooking and food preparation equipment and prohibited manufacture of more than 50 other types of commercial and domestic electric appliances, except as permitted under "spot authorization." Individual manufacturers who wish to obtain priorities assistance for increased production of the following 20 items for nonmilitary purposes in the third quarter will need to obtain manpower clearance on form WPB-3820 if they are located in group 1 or 2 labor classification areas and employ more than 100 workers: Commercial electric ovens and ranges at 17.5 per cent of the 1940 rate: commercial electric boilers, coffee mills, coffee urns, glass coffee makers, food choppers and grinders, food mixers, food servers, food slicers, fry kettles, griddles, grills, hotplates, juicers, stock kettles, toasters, vegetable peelers, and waffle irons at 10 per cent of the 1940 rate. (L-65)

HEARING AID BATTERIES: Order L-71-a which effected standardization of hearing aid batteries. (L-71-a)

ELECTRIC WIRING DEVICES: Order L-277 which established manufacturing and distribution controls over electrical heating devices and heater cord sets. (L-277)

AIR-CIRCUIT BREAKERS: Order L-300 which covered production and distribution of small air-circuit breakers. (L-300)

ALUMINUM SCRAP: Order M-1-d which permitted issuance of special directions regarding aluminum scrap. (M-1-d)

ALUMINUM PIGMENT AND ALUMINUM COMPOSITION: Order M-1-g which restricted manufacture, acquisition and disposition of aluminum pigment and aluminum composition. (M-1-g)

ALUMINUM DISTRIBUTORS: Order M-1-j which established procedure for acquisition of aluminum by distributors. (M-1-j)

ZINC: Order M-11-b which restricted use of zinc. Direction 1, which increased the number of permissive uses of zinc for coatings other than paint during the second and third quarters of 1945, and direction 3, which restricted use of zinc for manufacturing home canning closures, have been revoked. Existing allocation controls on slab zinc will be retained in order M-11. (M-11-b)

NEW ORDERS

ALUMINUM: A new aluminum order, M-1-L, incorporates various reporting provisions of orders M-1-d, M-1-g, and M-1-j, which have been revoked. The order provides that intra-industry orders for aluminum must be endorsed with the AM identification numbers issued by WPB. (M-1-L)

AMENDMENTS

ALUMINUM: Aluminum producers now may fill unrated orders for aluminum products, except aluminum extrusions, on condition that such action does not interfere with the filling of authorized controlled material orders or orders they have been specifically directed to fill. This was provided in amendment 4 to CMP regulation 1.

CMP regulation 4 was amended to explain how warehouses shall treat different kinds of orders for aluminum. Distributors need not accept orders bearing symbols from AM 9500 through 9599 (orders from other distributors), but if accepted they must be treated as authorized controlled material orders. Orders bearing symbols AM 9600 through AM 9699 must be treated as deferred ("Z") orders before July 1, 1945, and as unrated orders on and after that date.

Directions 49 (acceptance of orders and shipment of aluminum ingot) and direction 59 (aluminum for certain destructive and similar direct uses) to CMP regulation 1 have been amended to permit placement of unrated orders for aluminum ingot, to be used in alloying, deoxidizing and other "destructive" uses where the metal is not recoverable as aluminum.

Direction 57 (ingot for aluminum foundries) has been amended to make it consistent with a new order, M-1-l. Foundries now must use an AM number in ordering ingot to fill unrated as well as controlled material orders for castings.

The amended CMP regulation 1 also provides that a class B producer may use an allotment to fill his authorized production schedule for which the allotment was made or any of his other authorized production schedules within the same plant, but only for a product in the same product code listed in the WPB publication *"PRODUCTS AND PRIORITIES."* Formerly, such use was permitted for any class B product identified by the same symbol. (CMP 1 and 4)

WAREHOUSE ALUMINUM SALES: Quantity of authorized controlled material orders for aluminum that distributors may place has been limited by direction 7 to CMP regulation 4. An aluminum distributor may continue to place deferred orders (bearing a number in the 9600 series) without limit as to quantity. However, an aluminum distributor who has been assigned a number in the AM 9500 series must endorse all orders placed by him with producers or with other distributors as follows:

He must use his individually assigned AM number in the 9500 series to the extent that the total amount of aluminum he wishes to order for delivery in the third quarter of 1945 or any quarter thereafter does not exceed the amount of aluminum he delivered in the preceding calendar quarter on authorized controlled materials orders, including deferred (Z) orders, and any other orders that he has been directed to fill by WPB.

In endorsing orders for aluminum in excess of the above quantities, an aluminum distributor must not use his individually assigned AM number in the 9500 series, but must use the number AM 9600 instead. (CMP No. 4)

BRASS MILL WAREHOUSES: Direction 8 has been issued, instructing brass mill warehouses on how to replace, establish or increase their stocks; and providing that brass mill warehouses and brass mills are no longer required to file form 3007 on warehouse shipments unless specifically instructed to do so by WPB. It revokes all previous instructions and directions dealing with the replacement, establishment or increase in warehouse stocks. (CMP 4)

CONSTRUCTION: Direction 5 to the construction order L-41 has been amended setting up three categories of construction projects with criteria that must be satisfied within each category before authorization is granted. Applications are still filed on form WPB-617. It also provides for authorization without priorities assistance of projects that do not completely meet the stated criteria, or projects for which materials and equipment are on hand or are available without priorities. The three categories established in the amended direction are: Additions to or alterations of existing facilities to make civilian products; facilities for production of bottleneck materials or components used in other industries; and facilities for needed civilian production or services. (L-41)

COPPER: Purchase of copper raw materials up to a 30-day inventory supply without WPB authorization is now permitted. Order M-9 has been amended to eliminate: (1) A restriction on copper-clad and copper-base alloy-clad steel scrap, (2) a limitation on the quantity of self-generated scrap that any person could keep on hand, (3) a prohibition of melting or processing copper-base alloy scrap by persons other than those engaged in production of copper raw materials or copper controlled materials, and (4) restrictions on the use of scrap by utilities. Use by brass mills of forms WPB-2954 and WPB-3007 has been discontinued.

Use of any item of copper raw material is prohibited in the filling of unrated orders if doing so would interfere with the production of authorized controlled material orders or other defense orders.

Direction 5 has been issued, permitting brass mills and copper wire mills to order on a preferential basis intermediate shapes for further conversion to replace intermediate shapes previously used in filling authorized controlled material orders.

Directions 1, 3 and 4 have been revoked which, respectively, placed certain restrictions on the acceptance of delivery of scrap by scrap dealers; granted authorization for steel producers to accept delivery of, melt and process copper-clad and copper-base alloy-clad steel for the production of copper bearing carbon and alloy steel products; and restricted the use of fired cartridge cases. (M-9)

COLLAPSIBLE TUBES: Lead quotas for the manufacture of tubes for the packing of permitted products during the second quarter of 1945 have been increased from 20 to 25 per cent of the amount used in the like 1944 quarter in the case of tubes for dental cleansing preparations and from 40 to 50 per cent in the case of tubes for synthetic and natural rubber cement and pyrosylin cement. (M-115)

CAN ENAMELS: Order P-149 (can enamels) has been amended, clarifying the definition of "food" to exclude malt beverages, nonalcoholic beverages, wines and distilled spirits from the end uses to which the rating obtained by the order may be applied. The order assigns an AA-2 rating for the delivery of components to be used in the production of can enamels. (P-149)

UTILITIES: Contractors building consumer-owned utility service extensions (power, water, gas, and central station steam heat) have been authorized to use the CMP allotment symbol and the priority ratings assigned to utilities by order U-1 for the same type of construction. (U-1)

COMMUNICATIONS: Communications companies may install new facilities of any dollar cost, except buildings, on an unrated basis without obtaining prior approval from the Office of War Utilities. Buildings requiring not more than $25,000 worth of materials may be constructed on an unrated basis without specific authorization. AA-1 rating has been assigned to projects with a gross materials cost up to $25,000 when not more than $2500 worth of materials needs a rating. An AA-3 rating has been assigned for projects with a materials cost up to $25,000 when more than $2500 worth of materials needs a rating. (U-4, U-5)

PRICE REGULATIONS

CAST IRON SOIL PIPE: Ceiling prices of cast iron soil pipe and fittings have been increased $5 a ton at the foundry level, effective as of June 14, 1945. Ceilings are still on the basis of f.o.b. Birmingham, Ala., and are in terms of dollars and cents. Manufacturer-to-jobber sales also have been given dollar-and-cent ceilings that spell out customary discounts given on this type of sale. Manufacturer-to-user (or to installer) ceilings are identical with ceilings on sales by jobbers to users or installers. (No. 100)

Senate Restores Tariff-Cutting Power in Trade Agreements Act

Industry witnesses see danger from foreign competition if rates are reduced further. Manufacturing and mining interests believe tariff protection necessary to safeguard American enterprise. Senators ignore party lines in voting

SHARP differences in opinion over granting the administration authority to cut tariff rates by 50 per cent from current level arose in debates on the Reciprocal Trade Agreements Act in the Senate. The tariff cutting power was included in the bill as passed by the House, deleted by the Senate Finance Committee and later restored by a 47 to 33 vote by the full Senate.

Debate on the tariff-making feature of the bill was of a bipartisan nature Sen. Walter F. George (Dem., Ga.) maintained the tariff-cutting provision was "an essential weapon to preserve the American free enterprise system." Sen. Joseph O'Mahoney (Dem., Wyo.) viewed the delegation of power "a grave threat to democracy."

On the Republican side, Sen. Robert Taft of Ohio claimed further tariff reduction would "cripple American industry," while Sen. Charles W. Tobey of New Hamshire chided his fellow Republicans with the observation, "the Republican party hasn't learned much."

Testimony of industry witnesses before the Senate Finance Committee brought out divergent views of the trade agreements program, its benefits and its danger.

H. L. Coe, representing the Bicycle Institute of America, told the committee how American manufacturers through a promotion campaign costing several hundred thousand dollars had revived interest in cycling during the late thirties. From average sales of about 350,000 bicycles annually during the early thirties these manufacturers had built up a market for 2,000,000 units by 1941.

"This attractive market did not escape the notice of the alert British manufacturers, who quickly took advantage of the opportunity offered by the adoption of the reciprocal trade agreements and requested a reduction in the tariff," said Mr. Coe. "This was granted, and the present rates are now approximately 50 per cent lower than those under the former tariff.

"As a result of this favorable situation, the British manufacturers immediately started developing models which would compete with those for which our domestic manufacturers had created a substantial demand, and were prepared in 1938 and 1939 to make an aggressive campaign to capture a large share of our domestic business.

"These plans now are being motivated with every indication that the British intend to utilize their advantageous position to the fullest extent possible."

The bicycle industry in Great Britain has various advantages over our industry, said Mr. Coe. "They are mass producers of bicycles with three times the potential capacity of our industry; one company alone can turn out 430 bicycles per hour, which is twice that of our largest manufacturer. Their average wage rate is less than half ours, and there is no indication their production per man is not equal to ours. They have a substantial advantage over us in the cost of raw materials. As a result, they can put bicycles into the hands of American dealers at substantially less than our cost of production. Furthermore, while all but three of our manufacturers had to discontinue entirely production of bicycles during the war, the British industry has been running at a much higher level, and as of Jan. 1 of this year was authorized to step up immediately to 50 per cent of the prewar volume while we were held to about 12½ per cent.

"Much has been said about using the authority granted under the Reciprocal Trade Agreements Act as a bargaining device," Mr. Coe continued, "but it is interesting to note that while we were forced to take a 50 per cent cut in our tariff, the British bicycle industry is protected by a 33 1/3 per cent ad valorem duty—approximately double our rate and higher even than the 30 per cent effective under the former American tariff. It is obvious that so far as bicycles are concerned there was no 'reciprocity' in this deal, and that we are the victims of some astute maneuvering on the part of our cousins across the Atlantic.

Endangers Employment Program

"It is because of this experience that we urge this committee to prevent continuation of a procedure which surely will take from thousands of American workmen the opportunity to earn a living in their chosen occupation. Every foreign-built bicycle which comes into the American market means one of our workmen being idle for a day and a half. At a time when American industry will be called on for almost superhuman performance in meeting the unemployment situation, this is bound to have a serious effect.

"Certainly," Mr. Coe added, "until Great Britain has shown an inclination and put into operation regulations modifying the 'sterling bloc,' the Dominion preference, and other advantages, the benefits of which are denied to American manufacturers, it is no time to authorize still further reductions in tariffs in the hope that other countries will do likewise.

"I have heard the statement that no industry could show that it has been hurt by the reciprocal trade agreements," Mr.

ALL-AMERICAN HUDDLE: The United States delegation to the United Nations Conference on International Organization is shown above at San Francisco. Seated, left to right, are: Dean Virginia Gildersleeve, Rep. Sol Bloom, Sen. Tom Connally, Secretary of State Edward Stettinius, Sen. Arthur Vandenburg, Rep. Charles Eaton and Comm. Harold Stassen. NEA photo

The CONE AUTOMATIC MACHINE COMPANY

sees many

GOOD THINGS AHEAD

It is reported that . . . . . .

A new aluminum alloy, R-303, is claimed to be non-corrosive and to have twice the compressive strength of structural steel. *Reynolds Metals Co.*

get ready with CONE for tomorrow

A method has been announced for transmitting television programs over ordinary telephone lines, instead of coaxial cables or air relays, and for the recording of television in a manner comparable to the recording of radio. *Packard Mfg. Co.*

get ready with CONE for tomorrow

The fuel being used in the B-29's over Japan is said to have an octane rating well over 130. *Aero Digest.*

get ready with CONE for tomorrow

This year's models of one make of highway bus have rubber springs. *Twin Coach.*

get ready with CONE for tomorrow

A newly installed turbine generator, in a city power station, has twice the capacity of the 14 previously installed units combined. *Fisk Station, Chicago.*

get ready with CONE for tomorrow

One of our new aircraft engines weighs only 0.97 pounds per horse power. *Wright Cyclone 9.*

get ready with CONE for tomorrow

The first American-built steam turbine locomotive is being given a service test. *Baldwin Locomotive Works, Penna. R. R.*

get ready with CONE for tomorrow

Army aircraft are being "jacked up" when on soft ground by inflating large rubber pillows placed under the wings. *Science News Letter.*

get ready with CONE for tomorrow

A manufacturer of aluminum utensils is planning to make aluminum kitchen furniture. *Aluminum Cooking Utensils Company.*

White or light colored vitreous enamels can now be applied directly to steel surfaces. *Inland Steel Company.*

get ready with CONE for tomorrow

A company has been established to process three-dimensional photographs (vectographs) in quantity for civilians. *Three Dimension Company.*

get ready with CONE for tomorrow

A new processed wood called "Staypak" has been developed that is claimed to be twice as tough as "Compreg". *U. S. Forest Products Lab., Madison, Wisconsin.*

get ready with CONE for tomorrow

In one city a system of radiotelephone communications between a central station and public or private vehicles is expected to be in operation by next fall. *Pittsburgh.*

An airport bus, designed to connect small towns with main airlines, has a ticket office, flight control tower, freight space, lunch counter, two-way radio, telephone and washroom, as well as seating space for passengers. *Parks Air Transport East St. Louis.*

get ready with CONE for tomorrow

Reports say that one of our largest automobile manufacturers is planning an entirely new 5-cylinder car to sell at about 20% below the lowest prewar level. *Ford.*

get ready with CONE for tomorrow

A new process so reduces the cost of making gasoline from natural gas that a large refinery is being planned for this purpose. *M. W. Kellog, Jersey City.*

get ready with CONE for tomorrow

30 to 50 ton trucks as long as 75 feet have been built and are now being put to specialized uses, such as the hauling of ore, aircraft and prefabricated houses. *Scientific American.*

SPEED
for
tomorrow's
competition
Sixteen tools on an 8-spindle Conomatic complete this part in 23 seconds — including the small hole on the end.
CONE
AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U. S. A.
18

Coe went on, "Possibly that is true. But I wonder if the same statement could not have been made before Pearl Harbor that no American had lost his life? Must we go through the destruction of this industry, the impoverishment of these people that are in it, the ghost towns that will be created—here is Westfield, Mass., the main support of the town; the same is true in Glens Falls, N. Y.; Shelby, O., where these industries have been seated for a long while, where the community is dependent upon them. Must we go through that experience to convince Congress that it is no time to put us in that jeopardy?"

Josephus C. Trimble, Washington, representing the American Tungsten Association, filed a brief registering that association's opposition to any reduction in the duty on tungsten. This is a new industry in this country, and "it has been found that there are sufficient tungsten deposits to supply our domestic needs during peacetime," said the brief, but "with American labor being paid at least five times as much as the average labor of foreign competitive tungsten-producing countries, it becomes apparent that unless American labor is protected by the existing duty, the tungsten industry in the United States will be wiped out."

F. L. Hopkinson, chairman, International Trade Relations Division, World Trade Policy Committee, National Association of Manufacturers, informed the committee that his group favors renewal of the Reciprocal Trade Agreements Act but for one year only.

"In our opinion," said Mr. Hopkinson, "there is inadequate experience under peacetime conditions to judge the real operations and results under reciprocal trade agreements already made. We therefore believe there should be eliminated from the present bill the provision which would enlarge the power to change tariff rates in reciprocal trade agreements . . . . To extend and expand the act for a longer period in the face of the overwhelming international economic uncertainty immediately ahead seems to us like throwing away the caution that our dominant position impels us to heed."

William Benton, vice chairman, board of trustees, Committee for Economic Development, and chairman, Encyclopaedia Britannica, Chicago, told the committee that unless war debts and other obligations owed to the United States government are promptly and finally settled at the end of the war they will constitue a source of uncertainty and a burden on international enterprise.

"To achieve this end, we recommend: 1—Repeal of the Johnson act which forbids private loans to the governments of nations now in default; 2—prompt settlement of all foreign government debt to the United States government arising from World War I and of all net obligations to the United States arising under lend-lease or otherwise for goods and services actually used up in World War II; if cancellation of any of these obligations is the most effective method of settlement, they should be canceled; 3—lend-lease goods not used up in the war should be disposed of in ways and on terms which will aid the rehabilitation and reconstruction of the countries involved in the war."

In addition, Mr. Benton said, his committee recommends placing the international movement of capital, public or private, on an economic basis: 1—Export of capital should not be stimulated as a device to reduce unemployment in the United States; 2—the Export-Import Bank should be used to carry out financial transactions which are in the interest of the United States but which are unsuitable from the standpoint of private funds; 3—loans should not be used when they are in fact gifts; the United States should contribute to the organizations designated by Congress to help war-torn countries; 4—insofar as possible, the movement of capital should be carried on by private enterprise, with the government acting to facilitate such business.

Eliminate Artificial Barriers

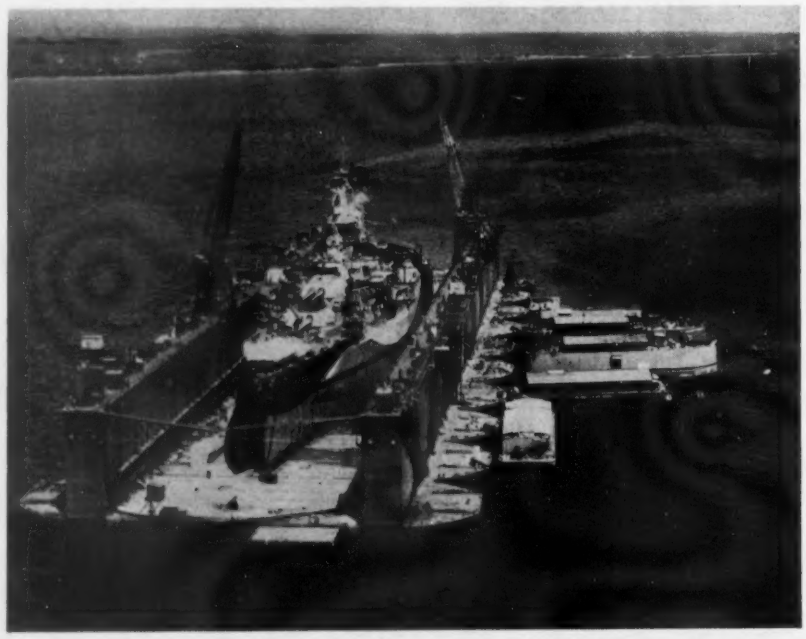
Too, artificial barriers to trade should be eliminated or reduced. Mr. Benton recommended renewal of the Reciprocal Trade Agreements Act, also that it be strengthened by making the 50 per cent limit to reductions apply to the rates existing in 1945, also that "negotiations under the act should be pressed vigorously so as to bring about substantial rate reductions."

C. Stewart Comeaux, secretary, Sporting Arms and Ammunition Manufacturers Institute, reported that this industry already is laboring under the burden of a 50 per cent reduction in tariff in 1935 "which resulted in a fivefold increase in importations of Belgian firearms."

Felix Edgar Wormser, secretary and treasurer, Lead Industries Association, declared the lead mining industry already has been injured by the postemergency cut of 20 per cent in the lead rates made in the trade agreements with Mexico in 1942; the extent of this injury will be more fully revealed after normal trade relationships are restored. Mr. Wormser opposed extension of power to cut tariff rates 50 per cent.

T. A. Potter, president, Elgin National Watch Co., and representing the American watch manufacturing industry, opposed the proposal to authorize reductions in tariff rates to the extent of an additional 50 per cent.

A healthy zinc mining and refining industry must be maintained at all costs within our own borders, Ernest V. Gent, secretary, American Zinc Institute Inc., told the committee. Zinc already has suffered a 20 per cent tariff reduction through the Canadian agreement and a further 30 per cent through the more recent Mexican treaty.



"FIELD HOSPITAL" FOR NAVY SHIPS: One of the largest factors in Navy operations conducted far from major land bases has been the development of the floating dry dock, known in the Navy as ABSDs—Advance Base Sectional Docks. The ABSDs are built in separate sections and moved as close to the combat zone as possible. Sections then are welded together into one huge dock with capacity of 56,000 to 100,000 tons, more than enough to lift the largest battlewagon and capable of servicing a number of smaller ships at the same time. Photo above shows a battleship in a 10-section dock. U. S. Navy photograph

MEN of INDUSTRY

C. F. McCRORY

CHARLES F. McBRIDE

WILLIAM SPRARAGEN

Charles F. McCrory has joined May-Fran Engineering Inc., Cleveland, as advertising manager. Mr. McCrory previously had been associated with Bethlehem Steel Co. at Johnstown, Pa. as sales engineer and more recently served as chief of production control, Fifth Regional War Production Board, Cleveland.

—o—

George H. Dowding has been promoted to director, industrial relations, Chicago district, Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Dowding succeeds **Peter V. Martin** who leaves for assignment abroad with the Foreign Economic Control Council. **Earl H. Fyler,** formerly assistant to the Chicago district director of industrial relations, succeeds Mr. Dowding as superintendent of industrial relations at the South Chicago plant. **Nathan Weston,** formerly on the staff of the vice president of industrial relations, Pittsburgh, succeeds Mr. Fyler.

—o—

J. L. Hyland, manager of the Cleveland district, Republic Steel Corp., Cleveland, has been given a leave of absence to serve as deputy chief of the metallurgical branch, United States Control Council in Germany. **J. H. Slater,** assistant district manager, Cleveland district of Republic, has been named acting district manager and **H. L. Allen,** open hearth superintendent, has been appointed acting assistant district manager by Republic.

—o—

Benjamin F. Courtright, who recently was appointed sales manager, Steel Division, International Harvester Co., Chicago, has been elected vice president, Wisconsin Steel Co., the sales organization. **Harry O. Bercher,** recently made assistant to the vice president of the Steel Division, also has been elected a vice president of the Wisconsin Steel Co.

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John D. Judge recently became associated with Mackenzie Walton Co., Pawtucket, R. I., as vice president. Mr. Judge formerly served as general superintendent with the Agaloy Tubing Co., Springfield, O.

—o—

Charles F. McBride, general traffic manager, Pittsburgh Steel Co., Pittsburgh, was elected president, Traffic Club of Pittsburgh at the annual meeting held recently. Other officers are: **Warner B. Shepherd,** assistant general traffic manager, Aluminum Co. of America, first vice president; **C. G. Magruder,** division freight agent, Pennsylvania railroad, second vice president; **R. E. Rogers,** general coal freight agent, New York Central System, third vice president; **Norman J. Conboy,** general agent, Texas & Pacific railway, secretary; **S. B. Duff,** traffic department, United States Steel Corp., treasurer; **L. G. Hults,** traffic manager, United Engineering & Foundry Co., **F. G. Moore,** traffic manager, Columbia Chemical Division, Pittsburgh Plate Glass Co., **M. C. Richards,** general traffic manager, National Supply Co., **A. C. Schweitzer,** traffic manager, United States Steel Corp., industrial governors; **A. H. Farrar,** freight traffic manager, Baltimore & Ohio railroad, transportation governor.

—o—

John C. Graf has been appointed sales manager, Hydraulic & Special Machinery Division, William Sellers & Co., Philadelphia. Mr. Graf for the past two years has served as sales manager, Baldwin Southwark Division, Baldwin Locomotive Works, Eddystone, Pa.

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L. LeRoy Mills has been appointed purchasing agent, General Fireproofing Co., Youngstown, O. Mr. Mills has been associated with the company for 18 years in the fields of estimating, production, factory supervision and purchasing.

—o—

Earle B. Tilton, has been elected president, treasurer and general manager, Vilter Mfg. Co., Milwaukee. Mr. Tilton formerly served as executive vice president, treasurer and general manager. **A. A. Silverman,** formerly with Hansen Glove Corp., is vice president; **Ludwig E. Loos,** secretary; **M. F. Grady,** former controller and assistant secretary now is assistant secretary-treasurer. Board members include **Messrs. Tilton, Silverman, Loos** and **C. G. Bach,** chief engineer, and **Wallace N. Nahin,** general sales manager.

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William Sparagen, executive secretary, Welding Research Council, Engineering Foundation has been appointed to the newly created position of director.

—o—

E. Robert Leeder, director of the Detroit artillery carriage section of Fisher Body Division, General Motors Corp., and former head of the Fisher Pontiac plant, has been elected vice president and assistant general manager, Martin-Parry Corp., York, Pa.

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J. Robert Walsh, purchasing agent, Cletrac Division, Oliver Corp., Cleveland, has been appointed director of purchases of the corporation with headquarters in Chicago. He succeeds the late **Harry S. Clay.**

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Avery C. Adams, vice president in charge of sales, United States Steel Corp. of Delaware, Pittsburgh, has resigned. **David F. Austin,** vice president in charge of sales, Carnegie-Illinois Steel Corp., Pittsburgh has been appointed acting vice president in charge of sales to succeed him.

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Arnold J. Karol for the past four years associated with Briggs & Turivas Inc., Blue Island, Ill., as scrap trader, has joined M. S. Kaplan Co., Chicago, in the same capacity.

—o—

Westinghouse Electric Corp., Pittsburgh, has announced that **Frank W. Godsey Jr.,** has been appointed manager of the corporation's New Products Division with headquarters at Pittsburgh. Mr. Godsey replaces **George H. Woodard** who was transferred to South Philadelphia as manager, Aviation Gas Turbine Division. **Frederick W. Rohde** has

PAUL MUELLER

MAJ. W. P. TIDWELL

I. B. MacLELLAN

been named manager of quality control, Aviation Gas Turbine Division. Mr. Rohde formerly was chief inspector, Jacobs Aircraft Engine Co., Pottstown, Pa.

—o—

Paul Mueller, formerly chief engineer, Blaw-Knox Co., Pittsburgh, will assume the post of manager of engineering and research, Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford, Conn., on July 2. Mr. Mueller formerly was associated with the organization in engineering from 1920 to 1927. His other associations include: Hartford Machine Screw Co., Hartford, Conn.; General Cable Corp., New York; Revere Copper & Brass Inc., New York; and Blaw-Knox Co.

—o—

E. G. Gardner and **James F. Howard** have been elected directors, National Enameling & Stamping Co., Milwaukee. Mr. Gardner and Mr. Howard also are vice presidents of the organization.

—o—

Milwaukee Section, American Institute of Electrical Engineers, recently selected the following new officers: **G. W. Clothier,** Allis-Chalmers Mfg. Co., chairman; **E. T. Sherwood,** Globe Union Inc., secretary; new directors, **C. P. Feldhausen,** Cutler-Hammer Inc., and **E. J. Limpel,** A. O. Smith Corp.

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Herbert S. Boring, comptroller, Van Der Horst Corp. of America, Cleveland, has been elected to membership in the Controllers Institute of America, New York.

—o—

Julius E. Graf, assistant chief engineer, Jones & Laughlin Steel Corp., Pittsburgh, has been appointed chief engineer of the metallurgical branch, Economic Division, United States Government Control Commission for Germany.

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Appointment of personnel managers for four territorial divisions, Replacement Tire Division, B. F. Goodrich Co., Akron, O., has been announced: **Dale Kramer,** Central Division, headquarters Kansas City; **N. W. Ferry,** Eastern Division, headquarters, Akron; **W. F. Geissel,** Southern Division, headquarters, Atlanta, Ga.; and **L. W. Siebert,** Pacific Division, headquarters, Los Angeles. **L. W. Siegel** has been named manager of the consolidated operating and salary administration departments of the Personnel Service Division.

—o—

Maj. W. P. Tidwell has resigned as director of information, Surplus Property Board, Washington, to enter private public relations practice with headquarters in Washington. Before going with the Army and subsequently with the Surplus Property Board, Major Tidwell for many years was with the Crucible Steel Co. of America, New York, as assistant to the president.

—o—

V. H. Baker has been appointed plant manager and production engineer, Springfield, O., plant, Elliott Co., Jeannette, Pa. Mr. Baker has been associated with the Elliott company 35 years. Other appointments include **L. A. Kunzler,** sales manager and **H. J. Schildt,** factory manager.

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Lloyd W. Hemingway has been added to the engineering development staff, Whiting Stoker Co., and has been assigned to Whiting Stoker Sales Co., Chicago.

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Harold C. Erskine, manager, Cleveland works, Aluminum Co. of America, has been appointed a representative of industry on the Fifth Regional War Labor Board, (Ohio, Kentucky-West Virginia area).

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Paul Isaacson, president, Young Iron Works, Seattle, and **Ted Isaacson,** vice president, Isaacson Iron Works, Seattle, have been named to the board of directors of the Isaacson company. **C. Harold Blomgren** was elected treasurer; **Harry D. Larson,** was appointed manager covering sales, service and development, Tractor Equipment Division; and **George S. Allen,** manager of mechanical engineering.

—o—

Ian B. MacLellan has been elected vice president and general manager, Newcomb-Detroit Co., Detroit. Mr. MacLellan has been associated with the organization since 1918 and in 1927 was elected secretary, which position he held up to his recent promotion. **John Z. Swartz** has been elected secretary and treasurer; **William T. Quick,** assistant treasurer; and **Lt. Avon L. Newcomb,** U.S.N.R., on leave of absence and now on active duty, is assistant secretary.

—o—

AC Spark Plug Division, General Motors Corp., Flint, Mich., has announced the following changes in its sales department: **Richard E. Merrell,** formerly manager of national account sales, has been named sales promotion manager on all AC replacement products; **Earl McGinnis,** formerly advertising manager, succeeds Mr. Merrell as manager of national account sales; **Frank E. Ray,** formerly assistant advertising manager, now is advertising manager.

—o—

Dr. Charles E. Skinner, founder of the Westinghouse Research Laboratories, who recently retired as a civilian consultant, Army Signal Corps, was honored recently by his former Westinghouse associates at a dinner marking his eightieth birthday.

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Robert D. McManigal has been elected a vice president, Westinghouse Electric International Co., New York. Mr. McManigal has been manager of the associated companies department since 1940.

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Dr. Kenneth B. Goldblum has been appointed group leader in charge of the research and development section, General Electric Co.'s Chemical Department, Pittsfield, Mass. **Roger Rice** has been named group leader of the standards and testing section succeeding Dr. Goldblum. Recent additions to the laboratory staff

DOUGLAS C. LYNCH

Recently named technical adviser to president, Philippine Islands. He is on leave from Westinghouse as noted in STEEL, June 18, p. 96.

F. F. DUGGAN

Who has been named general sales manager, Deepfreeze Division, North Chicago, Ill., as reported in STEEL, June 18, p. 96.

RAYMOND E. BIRCH

Who has been appointed director of research, Harbison-Walker Refractories Co., Pittsburgh, as noted in STEEL, May 28, p. 94.

include: **David J. Morrison** and **Alex E. Holstein,** resin development; **John W. Wellman,** research and chemical development; **G. Marshall Naul,** laminating development; **John W. Chapin,** chemical engineering.

—o—

John Elwood, general superintendent, Tractor Manufacturing Division, Caterpillar Tractor Co., Peoria, Ill., has been appointed assistant factory manager.

—o—

John E. Ricker, recently was appointed general superintendent, Kropp Forge Co., Chicago. Mr. Ricker previously served with the research department, Republic Steel Corp., Cleveland; Canton Drop Forging & Mfg. Co., Canton, O.; and Steel Improvement & Forge Co., Cleveland.

—o—

Peyton M. Magruder has been named director of commercial sales, Glenn L. Martin Co., Baltimore, Md. **John H. Humpstone** has been appointed assistant director of commercial sales in charge of export sales; **Howard Stansbury,** sales engineer of the Mars and and other flying boats and **John E. Soenke,** domestic commercial sales and manager of special projects. Until the end of the war, the appointees will handle their new activities in addition to their present war assignments.

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Nelson C. Dezendorf has been appointed director of sales, LaGrange, Ill. Electro-Motive Division, General Motors Corp., Detroit.

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Arthur J. McComb, Montclair, N. J., has resigned as deputy vice chairman for operations, War Production Board, and is returning to his position as a vice president, Otis Elevator Co., New York.

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Dr. O. S. Duffendack, director of research, North American Philips Co. Inc., Dobbs Ferry, N. Y., has been appointed vice president and director of research and engineering. **E. J. Kelly,** present manager of manufacturing was appointed vice president and general factory manager.

—o—

Walter Butcher, vice president, Bayless-Kerr Co., Cleveland, has been elected president of the Industrial Marketers of Cleveland. Other officers of the Industrial Marketers are: **Gene P. Robers,** advertising manager, Weatherhead Co., Cleveland, vice president; **Harry Grinton,** Cleveland regional vice president, McGraw-Hill Publishing Co., associate vice president; **W. S. Leech,** vice president, G. M. Basford Co., Cleveland, secretary-treasurer.

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Frank A. Schotters, works manager, Western Cartridge Co. plants, East Alton, Ill., has been named vice president in charge of production, Crosley Corp., Cincinnati, O.

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Harry H. Marsales, general traffic manager, Wickwire Spencer Steel Co., Buffalo, has been reappointed chairman, Transportation Committee, Buffalo Chamber of Commerce.

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Ben H. Firth has resigned from his position with the War Production Board, Washington, to become general manager of a household appliance manufacturing company to be located in Mexico City, Mexico. Prior to August 1942, when he went to Washington, Mr. Firth had been connected with the General Electric Supply Corp., Pittsburgh.

OBITUARIES . . .

Richard S. McCaffery, 71, professor of mining and metallurgy, University of Wisconsin, Madison, Wis., from 1914 to 1941, died June 12 at his home in New York. Since his retirement from the Wisconsin faculty, he had been a consulting metallurgist and mining engineer.

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John H. Jones, 89, former vice president, Belle City Mfg. Co., Racine, Wis., died recently in that city.

—o—

George Stupp, 82, one of the founders of the Stupp Bros. Bridge & Iron Co., St. Louis, died recently in that city. With his brothers Peter and Julius, he founded the Stupp Bros. company in 1874, was president and later chairman until 1919 when he became associated with the St. Louis Structural Steel Co.

—o—

Claude J. Holslag, 60, president, Electric Arc Inc., Newark, N. J., died June 11 in that city. Mr. Holslag was a welding authority, holding 200 patents on welding devices, and was the author of a welding handbook.

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Alton Coleman, 37, proprietor, Coleman Plating Works, Richmond, Va., died recently at his home in that city.

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Hal L. Purdy, 55, former vice president and general manager, Marmon Motor Car Co., Indianapolis, died recently in that city. Mr. Purdy also had been connected with the Packard Motor Car Co., Curtiss-Wright Corp., and Consolidated Vultee Aviation Corp.

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Lincoln De Groot Moss, 82, who retired in 1929 as professor of engineering, Columbia University, New York, died June 14, at his home at Babylon, Long Island, N. Y.

—o—

D. Owen Evans, 69, vice president, International Nickel Co. of Canada, and a Liberal member of the British Parliament, died June 11. Mr. Evans had been knighted by King George VI the previous week.

CUTS PRODUCTION COSTS

by Cutting Time On and Between Cuts

When you cut time on cuts and between cuts, production costs are also proportionately cut. Every one of the features built into the Bullard 36″ Cut Master Vertical Turret Lathe is aimed at cost savings.

Feeds and speeds are adequate for the fastest cutting tools. Rugged construction, screw feed for accuracy, smooth finish and power, metal-removing ability and ease of handling, make production of single piece jobs and larger runs equally profitable.

Notice these time-cutting features: speed changes made by two control levers within easy reach of the operator . . . unique Bullard chuck provides maximum grip with minimum wrench effort. Easy and quick adjustment of the main rail places the turret close to the work, thereby eliminating excessive tool overhang . . . independent side head permits simultaneous machining with vertical head without interference or lost time between cuts.

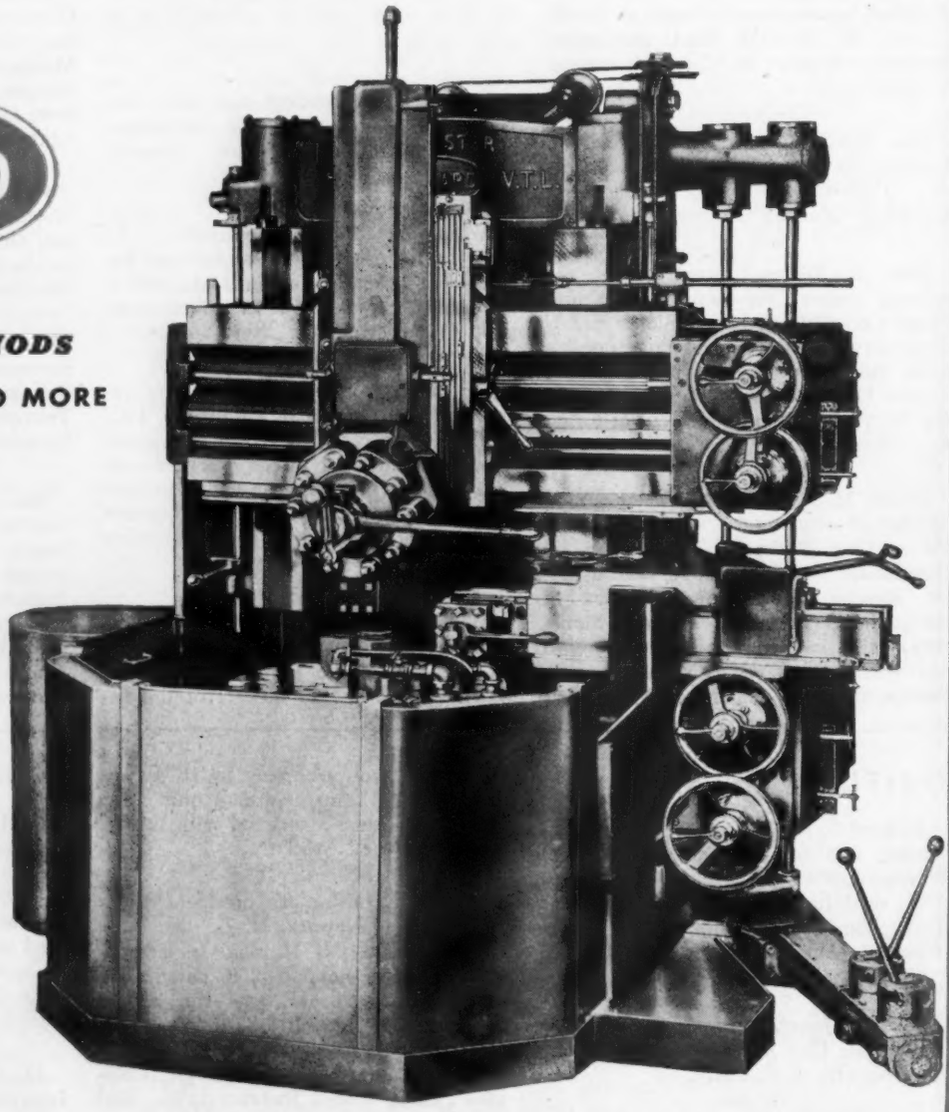
Extra heavy cutting of all heads simultaneously reduces machining time.

For other cost-cutting features of the Bullard 36″ Cut Master Vertical Turret Lathe, write today for Bulletin CVTL 3-10-44, The Bullard Company, Bridgeport 2, Connecticut.

BULLARD

CREATES *NEW METHODS*

TO MAKE MACHINES DO MORE



From Government Machine Tool Surplus Lists select the better machines to replace obsolete models you've been using on non-critical operations. Ask Bullard for information on these models by machine number.

BULLARD 36″ CUT MASTER VERTICAL TURRET LATHE with swiveling main turret head and non-swiveling side head. 20 table speeds. Built-in 3-jaw combination chuck or 4-jaw independent chuck. Each feed unit has 16 feeds ranging in geometric progression from .0026 to .500 per revolution of work spindle.

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Interunion conflicts spread as automakers turn toward reconversion. Outlook is for further trouble as restlessness increases in organized labor. Plastic upholstery material that is both water and flameproof announced by U. S. Rubber

SYMPTOMS of renewed outbreak of union trouble are "bustin' out all over" in the motor capital, as unemployment resulting from cutbacks makes its effect felt on dues payments to union treasuries. Highlight of the trouble at the moment is the conflict between the UAW-CIO and the AFL with respect to reconversion and new construction projects. Each union is insisting its members must be given full rights, to the exclusion of the other, on these jobs, and the result is a complete tieup of urgent construction work.

Last week the secretary of labor was asked to intervene by the UAW after the jurisdictional battle had tied up approximately $5 million in construction projects, including those at three plants of Chrysler Corp. A $2,500-000 addition to the Dodge Truck plant, for example, was stalled by 45 AFL construction workers quitting their jobs, ostensibly because Chrysler had refused to guarantee AFL workers would be given the responsibility for installing machinery in the addition.

The interunion conflict is nothing new, having started at Packard some months ago, and at that time automotive managements at once scented the danger it would spread as reconversion progressed. Their predictions have been confirmed and the outlook now is for further spread of the trouble. As proof, take a look at the labor trouble around Detroit on a single day last week—in addition to the Dodge tieup, construction projects at Chrysler-Kercheval and Plymouth were halted by walkouts of AFL men. At Ford, scattered walkouts of AFL men in the maintenance department and in the steel foundry occurred. Other sporadic strikes were listed at Federal-Mogul, Zenith Carburetor and half a dozen smaller manufacturers—all symptomatic of the growing restlessness of the union labor.

Wildcat Strike at Great Lakes Steel

At Great Lakes Steel Corp., all operations were suspended at blast furnaces and open hearths for several days by a walkout for which neither the company nor union could offer any explanation. The men just left their jobs, muttering something about "orders from Pittsburgh." In a couple of days they were back and production was resumed.

Enough tanks to equip more than 100 armored divisions, plus 86,000 tons of spare tank parts, have been delivered to the armed forces by Chrysler in the past four years. Of the 25,000 tanks produced in that period, more than 21,000 were new tanks of 10 different designs, all manufactured in the Chrysler Tank Arsenal in Detroit. The arsenal, and the company-operated Evansville (Ind.) ordnance plant, modified and reconditioned an additional 4000 of the vehicles.

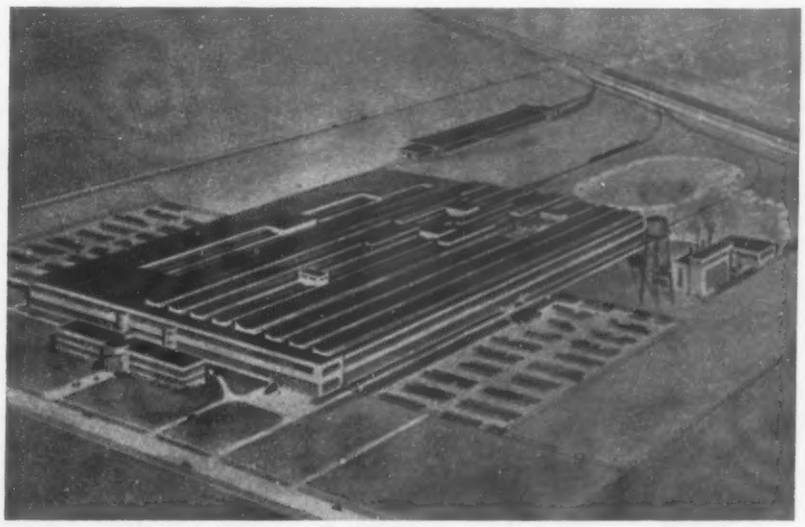
The company first contracted to make tanks on Aug. 15, 1940, when the government requested it to build an arsenal and build five tanks a day on a one-shift basis. Since that time tank manufacturing facilities reached a peak from an original 700,000 to 3,200,000 square feet of floor space in the arsenal and 13 other corporation plants. Employes increased from 5000 to more than 20,000 producing as many as 35 tanks daily on a three-shift basis. At the present time both employment and floor space have been reduced, and tank production is around 20 a day.

The first tank from the arsenal was accepted by the Army on April 24, 1941, and by summer of that year three assembly lines were sending tanks to the armed forces. Ten changes in models were made from the time the original 28-ton General Grant tank, mounting a 75-millimeter gun was produced until the 45-ton General Pershing, mounting a 90-millimeter long barrel rifle and 105-millimeter howitzer, came into being.

During the same period tank engineers undertook more than 1500 individual tank projects ranging from the designing of ten new tanks and the construction and modification of 150 test tanks to the construction, testing, and improvement of transmissions, suspensions, brakes, electrical equipment and materials. As part of the engineering program the company maintains a large proving ground where 62 different kinds of tanks and fighting vehicles have been tested and improved.

An extensive new line of plastic upholstery for civilian use which, for the first time, will provide designers and manufacturers with upholstery material that is both waterproof and flameproof, is announced by United States Rubber Co. The plastic upholstery, known as Naugahyde, will be made in a wide range of light and bright, clear decorative colors and even two-tone effects as well as in a variety of grains.

Because this new type material for civilian use is waterproof and unharmed by exposure, it can be used in lawn furniture, open cars, boats, and for other outdoor installations. It is not affected by perspiration, salt water, alcohol, gasoline, oil, greases, most acids and alkalies



NEW CHEVROLET PLANT: Architect's drawing shows proposed five-unit 28-acre manufacturing and assembly plant which Chevrolet will build on property adjoining the southwest city limits of Flint, Mich. With capacity of assembling 600 cars and trucks per 8-hour shift and employing about 1800, the project includes an assembly plant covering an area of 1,100,000 square feet within which will be a body-building section to be operated by Fisher Body; an office building, enclosed loading dock, customers' delivery building and power plant. At the rear is a test track. Plans were developed by Albert Kahn Associated Architects and Engineers, Detroit

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and can be cleaned with soap and water.

In addition to combining beauty of color with great durability, the upholstery will be easy to tailor since it is flexible and can be formed easily around curves, corners and edges. Other advantages are that it will not get hard or crack and will resist edge-wear, abrasion, scuffing, flexing and wrinkling.

Sales and earnings of Continental Motors Corp., and wholly-owned subsidiaries established new high records in the 1944 fiscal year ended Oct. 31. Sales totaled $246,212,225 against an adjusted total of $188,248,811 in the preceding year. For the 6 months ended April 30, 1945, first half of current fiscal year, they were $122,350,314.

Continental management believes engine output and sales in the immediate postwar period should exceed the best peacetime years in the company's 43-year history, and that sales should continue satisfactory when the engine business becomes stabilized after the anticipated postwar boom.

Continental's 1944 report stresses the company's strengthened industry position as the world's largest independent engine manufacturer, pointing out that acquisition of a controlling interest in the Wisconsin Motor Corp. in 1943 and all stock of the Gray Marine Motor Co. last year, should insure a dominant position in both the air-cooled industrial engine and the marine engine fields. It also points to strengthened customer relationships and important new engine contracts signed with large maufacturers of industrial equipment, farm implements and aircraft as reason for optimism over postwar prospects. In the aircraft engine field, several manufacturers now are planning to abandon their prewar practice of giving customers an option of engines. Instead, they will build their planes around Continental engines exclusively, it is reported.

Continental's report also announces plans to enter the growing diesel engine field with a new line of diesel engines starting at 25 horsepower and covering a wide power range about that level.

Detroit ordnance district has announced that the Grand Rapids Hardware Co. contract for .50-caliber machine gun belt links will be rescheduled late this summer as a result of the readjustment of war production from the two-front war to one-front against Japan. The revised program has been progressively rescheduled downward so that complete termination will be accomplished as of July 31.

Displaced Employes To Be Utilized

The impact of this cutback on manpower has not yet been determined but the tentative arrangement for any labor displacement will not occur until early in August. Company officials stated that a large percentage of the employes will be utilized on other war contracts and in reconversion to peacetime manufacturing.

Nash-Kelvinator has been notified of a major curtailment of propeller requirements for the A-26 Invader attack bomber, under which production of propellers will immediately be scheduled downward to terminate about the end of August. Other propeller production will continue.

Cutbacks in the production of tank engines is expected to place the Ford Motor Co.'s Lincoln plant on a 5-day operating schedule. Ford officials say employment will not be affected. The Lincoln plant is the only Ford unit now on a 6-day schedule. The June output of low silhouette GAF engines, used in N-26 tanks, and the GAA type, which power M-4 tanks, has been reduced by 200 engines.

Despite recent removal of WPB restrictions on the manufacture of all automotive replacements parts, initial production may be limited for weeks by shortages of necessary materials, in the opinion of the Automotive Council for War Production.

Another deterrent to quick resumption of production, effective in localities still classified by the War Manpower Commission as No. 1 and No. 2 labor shortage areas, is a regulation of the Office of War Mobilization and Reconversion which compels any manufacturer to get WMC approval before increasing production above the level prevailing in the fourth quarter of 1944. Some districts in which automotive plants are located still are subject to this control and the statistical information needed to back up such a request is virtually impossible to compile, he said.

Manufacture of some replacement parts, such as crankshafts, pistons, cylinder blocks, brakes, etc., has been permitted for many months under an AA-1 preference rating. The recent relaxation of WPB controls has no effect on such parts, which generally have been made in quantities to meet current needs.

Unlimited Nonfunctional Parts Output

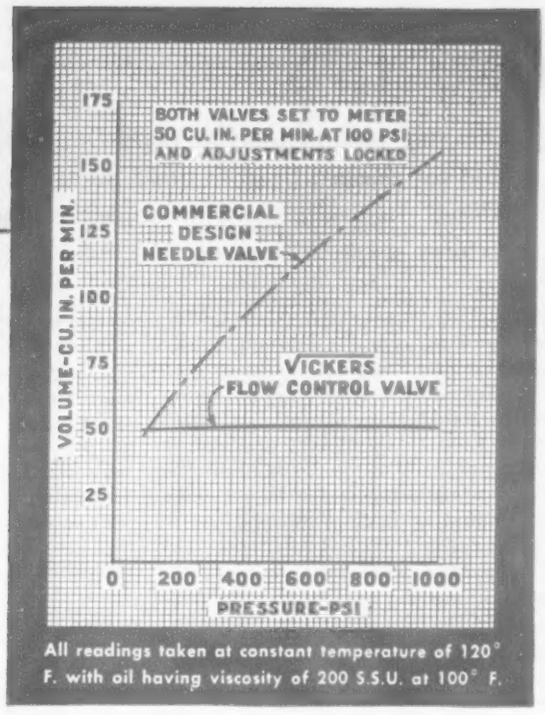
Manufacture of so-called nonfunctional parts, such as fenders, radiator grilles, door handles, etc., which has not been possible heretofore, is authorized now on an unlimited basis. This permission for resumption of production, however, does not carry any preference enabling manufacturers to secure necessary materials. Consequently, car owners anxious to replace crumpled fenders, broken grilles and other nonfunctional parts may not be able to satisfy their desire immediately.

In preparation for the changeover from wartime to peacetime production, several changes in Chevrolet assembly plant management have been made effective June 15. Management of the Atlanta assembly plant has been assigned to R. A. Johnson, who in his 18 years with Chevrolet has served in various capacities at the St. Louis, Cincinnati and Oakland, Calif., plants. For the last two years he has been stationed at Flint, where he worked on special assignments.

D. S. Zimmerman, for the last ten years manager of the Atlanta assembly plant, is being transferred to the management of the assembly plant located at Norwood, O. Management of the Kansas City assembly plant will be taken over by Floyd R. Lyness, for the last ten years manager of the Norwood plant.

ENGLISH AUTOMAKERS RECONVERT: New passenger cars are shown in production at the Morris Motors factory at Cowley, England. Sir Miles Thomas, vice chairman of the company, says production will accelerate rapidly and the company should be in position to suppy private motorists before the end of the year. NEA photo

CONSTANT FLOW RATE REGARDLESS OF VARIATIONS IN FLUID PRESSURE



All readings taken at constant temperature of 120° F. with oil having viscosity of 200 S.S.U. at 100° F.

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This valve combines in one unit the means for accomplishing three independent functions: (1) adjustable control of flow rate in the hydraulic circuit, (2) adjustable overload pressure protection in the hydraulic system, and (3) remote "Start and Stop" control when used with suitable pilot valve. See Bulletin 40-22 for complete information. Vickers Application Engineers will gladly discuss with you how "hydraulics" can be used to your advantage.

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WING TIPS

Obsolete tooling used to build Douglas A-20 attack bombers sold for scrap. Used to build nearly 7100 fighting planes for Allies. Twelve to sixteen thousand dollars realized on jigs and fixtures originally costing $10 million

JIGS, dies, fixtures and other tooling used to turn out the Douglas A-20 attack bomber and originally costing about $10 million have been sold for scrap by the Douglas Aircraft Co., Santa Monica, Calif. The tooling was used to build nearly 7100 of the A-20s before the plane was obsoleted in the fall of 1944.

The obsolete tooling is estimated to weigh between 1500 and 2000 tons. The selling price was $8.05 a ton and the purchaser was the Eastern Iron & Metal Co. Ltd., Los Angeles.

Much of the salvage material is expected to be No. 1 steel.

The first A-20s, also known as Havocs to our flyers and as Bostons to British flyers, were turned out at Douglas, El Segundo, where the DB-7, prototype of the Havoc, was designed and built. Bulk of the Havocs were built at the main Douglas plant at Santa Monica, although several hundred planes were turned out by Douglas, Long Beach, and several hundred more by Boeing Aircraft Co., Seattle.

In action first in the "Battle of Britain," the Havoc helped turn the tide in the air war and aided immeasurably in establishing and maintaining Allied supremacy in European skies.

The A-20 tooling consists of highly specialized tools which are now unusable and obsolete. When Douglas' speedy new A-26 attack bomber, the Invader, succeeded the A-20, all tooling that could be readily adapted for use on the A-26 and on the Douglas C-54 Skymaster was retained by Douglas; the rest was hauled off to the Culver City dog track.

Douglas and the Western District of the Air Technical Service Command co-operated in expediting the clearance of this tooling from the plant to make way for C-54 production, which then had—and still has—a high priority. This was accomplished by removing the tools, jigs, fixtures and dies behind the last A-20s as they moved down the assembly line. Within one week after the final plane had been completed and accepted by the AAF on Sept. 25 of last year, the Douglas plants had been cleared of all A-20 tooling. Magnitude of the task is evidenced by the fact that the inventory comprised more than 150,000 individual items, ranging from giant fuselage assembly jigs 15 feet long and 6 feet high to 6-inch templets.

GE Establishes Base For Flight Laboratories

A base for flying laboratories designed to speed through scientific and mechanical tests new military and civilian aerial developments, such as the actual harnessing of jet engine and gas turbine power for new-type planes is being established at the Schenectady county, N. Y., airport by General Electric Co.

C. G. Talbot has been appointed manager of the new Flight Test Division of General Electric, which will have control of this test headquarters, where many new aerial advancements will receive their initial operations in flight. N. F. Frischhertz, now stationed in Brownsville, Tex., where General Electric has tested many aviation developments now being used by the armed forces, is the assistant manager.

Work on a big hangar and ground laboratory will begin immediately at the airport. This hangar and laboratory will be 100 feet wide, 180 feet deep and 45 feet high in the center. Two floors of laboratories, work rooms and offices will run down one side. In front will be a high control tower with all of the latest electronic and mechanical equipment. It will be near the Saratoga road, adjacent to the 5000-foot North-South runway.

The testing base will be completed and in operation in the fall, Mr. Talbot said. "It will put the actual flight test operations in close contact with top ranking engineers of the company and research laboratory facilities. That is certain to speed many new developments into actual use on military and civilian planes."

Developments already scheduled for flight laboratory tests are: Jet engines and gas turbines; armament; autopilots; electronics; instruments; electrical power systems, communications, and power apparatus.

The broad field covered by General Electric aviation developments make it certain that at various times planes of virtually all kinds will be in operation at Schenectady airport. These might in a single day vary from advanced jet fighters to privately owned helicopters. Also, these tests will be made when conditions permit for civilian companies, as well as the armed forces.

Airlines Fly Average of 525,304 Miles Daily

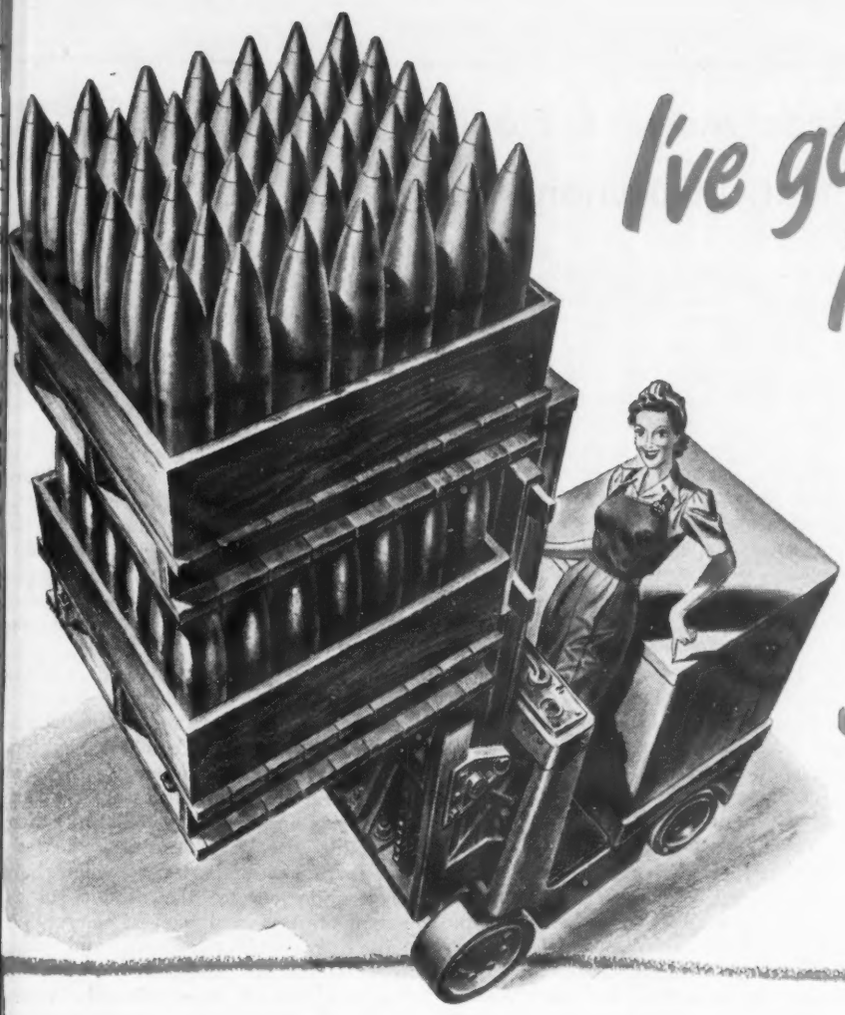
Domestic airlines of the United States are now flying an average of 525,304 miles daily compared with 364,445 in 1941, the year before the military forces requisitioned nearly one-half their planes.

The big transport planes of the airlines are now in the air an average of 11.39 hours daily. This is a gain of 79 per cent over the average of 6.35 hours in 1941.

On May 18, 1942, after supplying the military needs, the airlines had 160 planes. On April 1 of this year they had 362 planes of which 293 were in service.

The increased number of planes coupled with the jump in plane utilization has made possible a great increase in the number of flights scheduled by the airlines, according to the Air Transport Association of America. There are, for instance, now 40 round trips daily between New York and Boston compared with 23 in May, 1942.

Panoramic view of seven acres of obsolete tooling used to build the Douglas A-20 attack bomber is shown here outside Los Angeles. It has been sold for scrap



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Cleveland Division Speeds Martin's Plane Production by Procurement, Inspection Aid

PLANE production at Glenn L. Martin Co.'s plants has been aided substantially throughout the war by the procurement and inspection of vitally needed rough castings, forgings, aluminum alloys and other materials at the company's Cleveland Division.

During the first three years of operation, the Cleveland plant inspected an average of about one million pounds of rough materials a month, the company's monthly publication *Martin Star* states. Sixty per cent of all rough castings and forgings, inspected by the company, has been handled by this small plant.

Average time from receipt of castings at the Martin's Cleveland division until inspection and shipment has been completed is 24 to 48 hours, while on rush matters it has been shaved to six. Time required to move rough castings and forgings between the foundry and the concern doing the machining operations has been cut about 40 per cent.

The monthly inspection record at the Cleveland plant occurred in December, 1943, when 1,750,000 pounds of materials were checked — visually, dimensionally and radiographically inspected. A total of 35,410 square feet of X-ray film were exposed in that record month alone. Through Dec. 31 last, a total of 30,333,000 pounds of rough materials were inspected at this plant.

Full co-operation with the foundries and forge shops, many of which were doing aircraft work for the first time, has been constantly carried out. The rough material coming in generally was in satisfactory condition, for only 3 per cent rejections have been the average in 2½ years.

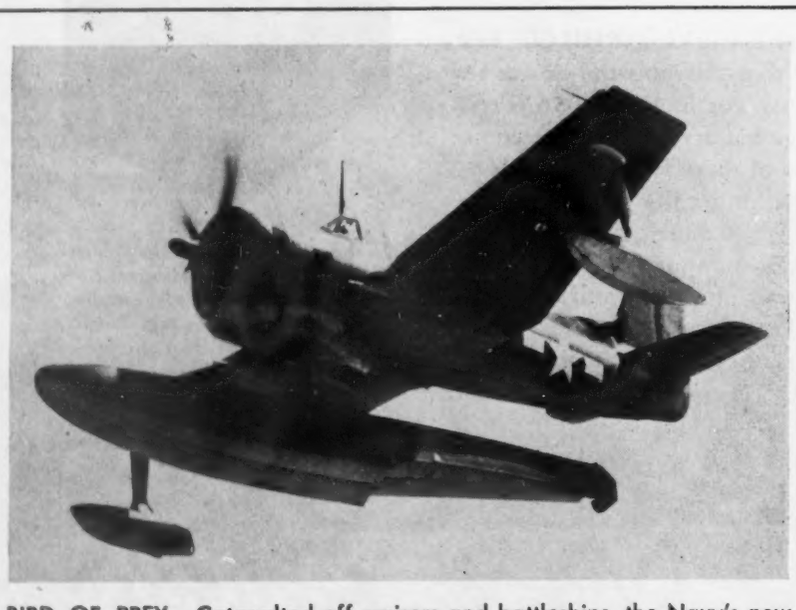
An example of this co-operation is the experience of one Cleveland foundry which had a contract for 280-pound aluminum alloy castings. The foundry had some difficulty in furnishing acceptable castings due to the size and necessary design. On information supplied by Martin's Cleveland division, rejections were reduced from 47 per cent to 4.26 per cent.

Another local plant was doing well, when suddenly an entire lot arrived and was rejected due to a minor flaw. By new control methods, the seller was immediately notified, enabling him to correct the defect in a few hours instead of a week or more.

A large Pacific coast aircraft manufacturer needed an immediate check inspection on many parts, which were believed to have been cracked in machining. The Cleveland plant offered its services to check them and made possible an almost immediate release of the parts.

Glenn L. Martin's chief inspection plant was located in Cleveland because of the proximity to countless vital subcontractors. Skilled labor, well above the average, was available. To increase their potentialities, arrangements were made with Fenn College in Cleveland to provide special training courses in various inspection means.

By November, 1942, Martin's Cleveland Division was awarded the Army's "A" for "approved quality control rating."



BIRD OF PREY: Catapulted off cruisers and battleships, the Navy's new SC-1 "Seahawk" spots the ship's gunfire, searches out enemy vessels and acts as a rescue plane when necessary. Faster than the "Kingfisher," the Curtiss-Wright "Seahawk" incorporates the newest advances in seaplane design. This photo shows the craft's unusual wing design. U. S. Navy photo

CAA Approves 125 Types of Planes for Civilian Use

Civil Aeronautics Administration has approved 125 types of surplus military aircraft as being suitable for use in civilian flying, since the beginning of the aircraft disposal program in 1944, RFC announced. The RFC is the agency designated by the Surplus Property Board for the disposal of surplus aircraft.

More than 130 models have been found by the CAA to be ineligible for civil certification. These are largely tactical aircraft such as bombers, fighters, special trainers, and other types which were built especially for war use. The RFC has approximately 6000 of these ineligible aircraft in surplus.

The 125 aircraft types which have been approved are the product of 21 manufacturers, and consist largely of liaison, trainers, transports, and other types which are adaptable to civil use. These approved types actually represent several thousand surplus aircraft which are now being sold at RFC sales centers throughout the country.

A special CAA military test base has been in operation at the RFC sales-storage center at Bush Field, Augusta, Ga., since November, 1944, for the purpose of determining the eligibility of military types of aircraft for civil certification.

As a standard practice which has been in effect since July, 1944, the RFC submits one aircraft of each type declared surplus by the Army and Navy to CAA engineers who determine its eligibility for civil certification. If this model is found to be suitable for civil use a type-certificate is issued. Purchasers of individual aircraft of this type then must have them examined by CAA inspectors to see that they are in airworthy condition and are in every respect like the original type-certificated model.

Lend-Lease Aid to China Increasing Steadily

Lend-lease assistance provided by the United States to China in the form of materials for war actually sent to her since March, 1941, or consigned to United States generals for transfer to the Chinese forces in the Far Eastern theater, totaled $458,874,000 through April, 1945, Leo T. Crowley, foreign economic administrator, has announced.

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Steel's Wartime Advances Cited; Public To Benefit

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EQUIVALENT of ten years' technological progress has been encompassed in four years under the pressure of war necessities and the advent of peace will see vastly superior steels flowing into peacetime products.

This is emphasized in a summary of wartime advances in steelmaking released recently by the United States Steel Corp.

Cited are the advances made in alloy steel, as result of the intensified study of the alloying elements necessitated by shortages of these elements. The National Emergency steels, designed to make the most effective use of the alloying agents and tested for various qualities, will be available for civilian use. Technological data for the handling of these steels also will be available.

Heat treatment has undergone special study during the emergency and precise procedures and properly regulated cycles, based on detailed investigations, have been devised.

Stainless steel, which was finding wider uses in transportation before the war, will be available for even greater adaptation in the postwar era.

Electrolytic tin plate capacity, saving 60 per cent of the tin formerly used, has been expanded.

Transportation Steels Developed

High strength steels for weight reduction of rolling stock have been developed. New grades of alloy seamless tubing, developed for airplane construction, will be available for many peace time uses.

The speedy deposition of a thin phosphate film on sheet or strip steel has found many uses in wartime and will continue to serve requirements in the postwar years. New pickling processes have been developed and one corporation subsidiary has worked out a novel and advantageous adaptation of the continuous pickling method.

In the war's early years there was a shortage of brass for cartridge cases. The steel industry was asked to make them of steel in great quantities. It conducted exhaustive research and met the problem. The shortage of brass abated, but the steelmaker learned new points in the deep drawing of steel, which have contributed greatly to his art. Welding of steel plates, which has been practiced on the ships of wartime construction as never before, has become a common tool of fabrication. New advances have been made in forging and casting steel.

A direct contribution from war to the comforts of peace is the steel which has been developed for military springs. Rugged enough for a jeep or a tank, yet capable of finer applications, this material will be extremely useful to industry. A new "supercharger" steel, well adapted to operate at the high temperatures encountered in the exhaust systems of airplanes, may be used for gas turbine blading.

Add to these fresh wartime developments special steels for landing mats which may be used to minimize soil erosion in the future, abrasion-resisting grips for conveyor belts, a special galvanized sheet steel for air-conditioning ducts, better enameling stock for signs and construction, as well as for household goods.

BATTLE SCRAP: Bethlehem Steel Co. has purchased about 1500 tons of scrap from the U.S.S. FRANKLIN, aircraft carrier which was damaged in the May 19 action off Japan but which limped home under its own power. The scrap was sent to the Bethlehem, Pa., yard of the steel company and part of it is shown here unloaded beside the yard track

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Wallace G. Imhoff Co., consultant in zinc coating, has moved from Vineland, N. J., to 905 South Bedford street, Los Angeles.

—o—

Commercio Exterior Inc. has changed its name to Pacific International Corp., 19 Rector street, New York 6.

—o—

American Society of Tool Engineers, Detroit, has granted charters to a new chapter at Cedar Rapids, Iowa, and a new chapter at Aurora, Ill. John M. Speck, machine design engineer, Cherry-Burrell Corp., is chairman of the Cedar Rapids group, and Thomas L. Kings, chief tool designer, Austin-Western Co., Aurora, is chairman of the Aurora chapter.

—o—

Kropp Forge Co., 5301 West Roosevelt road, Chicago 50, has issued a 20-page illustrated *Glossary of Forging Terms.*

—o—

U. S. Rubber Co., New York, has opened a temporary plant in Berlin, N. H., for production of "Mae West" life vests needed by the Navy in the war against Japan.

—o—

General Motors Corp., Detroit, an-

nounced that its total number of 423,837 common and preferred stockholders in the second quarter of 1945 is the highest in history.

—o—

Bureau of Mines announced that relaxation of security regulations permits release for public distribution of the heretofore confidential 1943 Minerals Yearbook, the nation's most comprehensive and authoritative publication on production, distribution, and consumption of mineral commodities.

—o—

Genesee Tool Co., Fenton, Mich., has established an office at 8855 Woodward avenue, Detroit 2, with E. W. Keck, service and sales engineer, in charge.

—o—

Reynolds Metal Co., Richmond, Va., announced an extensive postwar building and research program is being planned for its Plastics Division at Gary, Ind.

—o—

Revolvator Co., North Bergen, N. J., has appointed the Gilbert Engineering Co., Balter building, New Orleans 2, as representative for Louisiana and parts of Alabama and Mississippi.

—o—

General American Transportation Corp., Chicago, announced that negotiations have been completed for acquiring Eclipse Moulded Products Co., Milwaukee. Operations of Eclipse will continue as before under the same management.

—o—

American Machinery & Supply Co., Omaha, Nebr., distributor of construction, industrial and railroad equipment, has changed its name to T. S. McShane Co.

—o—

Hunt Tool Co., Casper, Wyo., has been purchased by Fred M. Manning. He also has bought the interests of E. E. Brown in the Manning & Brown Co. Inc., and the Industrial Power Unit Inc. The Hunt Tool Co. will be known as Western Oil Tool Co.

—o—

Food Machinery Corp.'s subsidiary, Niagara Sprayer & Chemical Co., Middleport, N. Y., will expand its Pacific Coast operations and has named A. J. Flebut western manager for Niagara. His headquarters will be in Richmond, Calif.

—o—

Readjustment Distribution Center, 90 Church street, New York 7, is issuing without charge an Army-Navy Contractors Guide outlining suggested methods of advance planning and illustrating practical procedures for settling terminated war contracts.

—o—

Brebner-Sinz Machinery Co., Green Bay, Wis., distributor of construction and industrial machinery, with a branch at Marquette, Mich., has changed its firm name to Brebner Machinery Co. Inc.

—o—

Dietrich Bros. Inc., Baltimore, has awarded a contract for a new shear house enclosure and enlargement of its locker building.

—o—

Maryland Car Wheel Co., Baltimore, is making extensive alterations.

—o—

Fluid Controls Co., Philadelphia, has been appointed valve distributor for R-S Products Corp., Philadelphia.

—o—

Sexton Foundry Co., Baltimore, has installed new equipment. The company, producing commercial castings, is using the former foundry of the S. B. Sexton Foundry & Mfg. Corp., which now produces stoves and parts by contract.

—o—

Rheem Research Products Inc. has moved its general offices to Standard Oil building, St. Paul and Franklin streets, Baltimore 2.

STUDY OIL INDUSTRY'S NEEDS: Postwar needs of the petroleum industry were discussed at a recent meeting of top executives of three of the Dresser Industries companies recently at Huntington Park, Calif. Left to right: L. R. Wells, president, International Derrick & Equipment Co. of California; C. J. Coberly, president, Kobe Inc.; J. B. O'Connor, executive vice president of Dresser; and E. J. Weis, vice president, Pacific Pumps Inc.

AWARDS . . .

Excellence in production of war materials has brought the Army-Navy "E" award to the following:

Allen Mfg. Co., Nashville, Tenn.
Amperex Electronic Corp., Brooklyn, N. Y.
Aro Equipment Co., Bryan, O.
Atlas Fence Co., Philadelphia.
Atlas Powder Co., White Haven Works, White Haven, Pa.
Babcock & Wilcox Co., Barberton Plant, Barberton, O.
Blackhawk Foundry & Machine Co., Davenport, Iowa.
Blumenstein & Co., New York.
Carver Pump Co., Muscatine, Iowa.
Caterpillar Tractor Co., Caterpillar Military Engine Co., Victory Ordnance Plant, Decatur, Ill.
Cherry Rivet Co., Los Angeles.
Dravo Corp., Neville Island Shipyard, Pittsburgh.
Fall Spring & Wire Co., Attalla Mfg. Co., Attalla, Ala.
General Cable Corp., Buffalo Plant, Buffalo.
General Motors Corp., Fisher Body Division, Fisher Body Cleveland Division, Plant No. 1, Cleveland.
General Motors Corp., Fisher Body Division, Fisher Body Lansing Division, Lansing, Mich.
Howard Mfg. Corp., Council Bluffs, Iowa.
International Silver Co., Factory "P", Wallingford, Conn.
Kelly Plating Co., Cleveland.
Macwhyte Co., Kenosha, Wis.
McDowell Mfg. Co., Millvale, Pa.
Metal & Alloy Specialties Co. Inc., Buffalo.
National Battery Co., Gould Industrial Division, Depew, N. Y.
New Haven Clock Co., New Haven, Conn.
Pangborn Corp., Hagerstown, Md.
Plastic Wire & Cable Corp., Norwich, Conn.
Ready-Power Co., Ready-Power Division, Detroit.
Sprague Electric Co., North Adams, Mass.
United Transformer Corp., New York.
Vollrath Co., Sheboygan, Wis.
Western Cartridge Co., Olin Industries Inc., East Alton, Ill.
Wheaton Brass Works, Newark, N. J.
Wheeling Corrugating Co., Wheeling Plant, Wheeling, W. Va.
Wyckoff Steel Co., Ambridge, Pa., and Chicago Plants.

New Organization Formed By Industrial Designers

Society of Industrial Designers has been organized with temporary offices at 55 West Forty-second street, New York, "to establish criteria for ethics, training and practice." Walter Dorwin Teague, designer, 444 Madison avenue, that city, is president. Raymond Loewy is chairman of the executive committee, Henry Dreyfuss, vice president, Harold Van Doren, treasurer, and Egmont Arens, secretary. Philip McConnell, recently of the Treasury Department, has been appointed executive secretary.

BUG BOMB insecticide dispenser, made exclusively for use by the armed forces to combat mosquitoes and other disease-carrying insects, is being produced at the rate of 50,000 per day from plants formerly devoted to domestic refrigerator manufacture. And the propellant which forces insecticide from the container is Freon—a gas that, before the war, was one of the principal refrigerating agents.

Research to find an aerosol method of spraying began several years ago at the Bureau of Entomology and Plant Quarantine of the U. S. Department of Agriculture. If an insecticide could be broken down into small concentrated particles, it would remain in the air for long pe-

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BOMBS

Production of small but mighty "bombs" used to spray insecticides requires some unusual techniques to insure both light weight and resistance to high pressures. Peacetime market being studied

riods and hence the same amount of basic insecticide would be many times more effective than older methods of dispersion. An answer to the problem was found by Dr. Lyle D. Goodhue and his associate, Dr. W. N. Sullivan, who developed the Freon-aerosol method and assigned their patent to the Secretary of Agriculture and his successors.

Freon was selected to produce the required aerosol because it is nontoxic to human beings, nonflammable, does not harm foods or fabrics, and because insecticide ingredients readily dissolve in it. Applied to bug bombs, it propels insecticide into the air in particles so fine that there may be 100,000,000 of them in a single drop of liquid. When this mixture leaves the dispenser, the Freon, in which pyrethrum and sesame oil—the insecticides—are dissolved, evaporates instantaneously, leaving insecticide suspended in air.

Container Development: Steel container presented a difficult problem, because it had to be light, inexpensive, and safe for pressures anticipated. Protection against high pressure due to overheating had to be provided. Because Freon is a gas at room temperatures and atmospheric pressure, it is necessary to keep liquid Freon under pressures higher than atmospheric in filling the bombs. When the container is fully charged, the pressure inside is 82 psi absolute at 68° F.

Refrigeration engineers, experienced in metalworking, who had developed highly efficient methods of charging refrigerators with Freon during peacetime, quickly worked out safe, speedy methods of manufacturing and charging the bombs. Initial delivery to the Army was made only 7 weeks after the first contract was received.

Container is built to withstand pressures up to 1800 psi. Pressures this high are not encountered in properly filled containers unless they are subjected to high temperatures such as in a fire. Even so, there would be no explosion, as an escape hole is punched in the bottom of the container and covered with a steel rupture disk, a type of safety valve, sealed into place by furnace brazing. The cloverleaf design of the disk causes it to rupture at a safe pressure, releasing the contents without violence.

As the disk is only 1/3000-in. thick, a method of brazing this paper-thin piece to the container, which is about 15 times thicker, was perfected only after extensive experiments in controlled atmosphere furnaces. By precise control of nitrogen, hydrogen, and carbon dioxide at temperatures in excess of 2000° F., the correct mixture necessary to securely braze the two parts together was then determined.

Severe tests have demonstrated the safety of the container even under the most destructive conditions. Loaded bombs have been dropped from an airplane on to concrete from a height of 80 ft and have been thrown into high temperature furnaces without a single explosion.

Manufacturing: Top and bottom shell of the container are stamped out as flat disks from long rolls of 0.044-in. thick steel plate at the rate of 420 per minute. These disks are drawn into shape in one operation and then trimmed, embossed, punched and washed, resulting in the shells shown in Fig. 2. Because of the small 0.017-in. opening in the capillary tube through which the mixture leaves the container, the interior of the bomb must be entirely free of dirt particles. Capillary tube is held in position with a clip which is spot welded to the container. The end of the tube is so located at the bottom of the shell that mixture will be expelled to the last drop.

The nipple is pressed into the top shell and furnace brazed to the shell and capillary tube. Capillary tube passes out of the bomb through the nipple and is sealed off after charging.

All parts except seal cap and plug are assembled as shown in Fig. 3. Rings of copper wire then are placed around parts to be brazed. A hole opposite the nipple allows heated air to escape as the bomb passes through the electric brazing furnace. Precise control of the atmosphere within the furnace is required to secure a smooth leak-proof joint as bombs pass through the oven on an endless conveyor. The interior of the furnace is filled with inert gas at a pressure slight-

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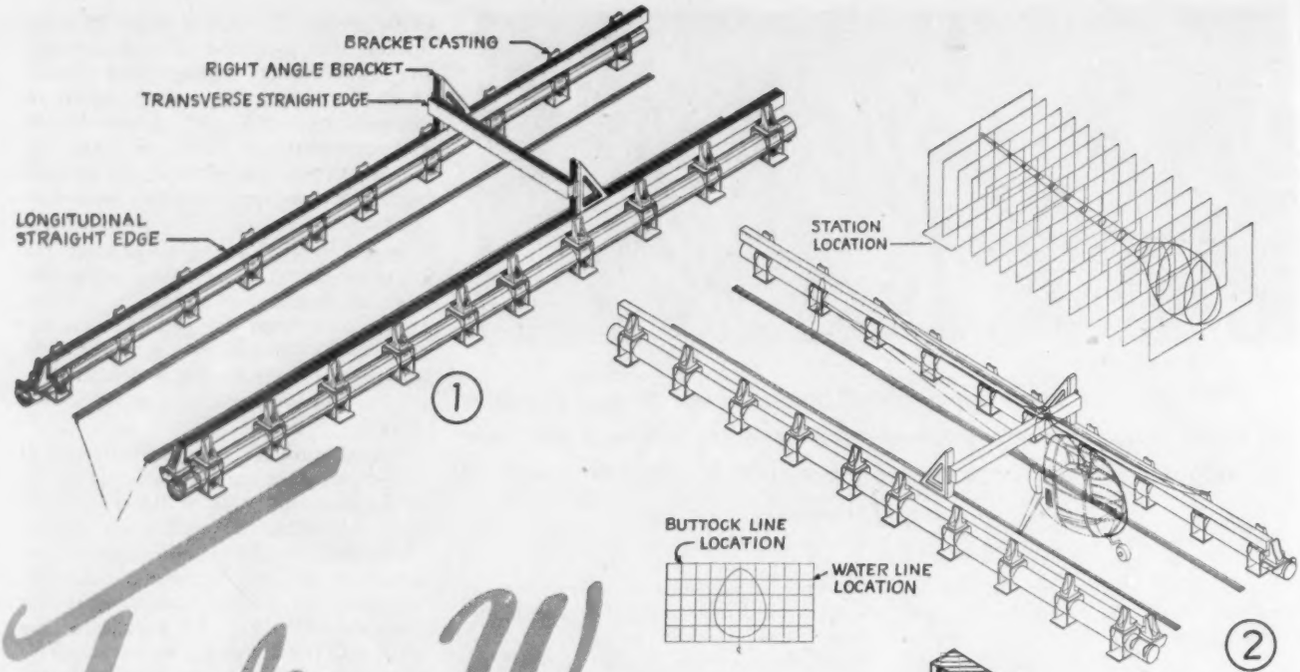
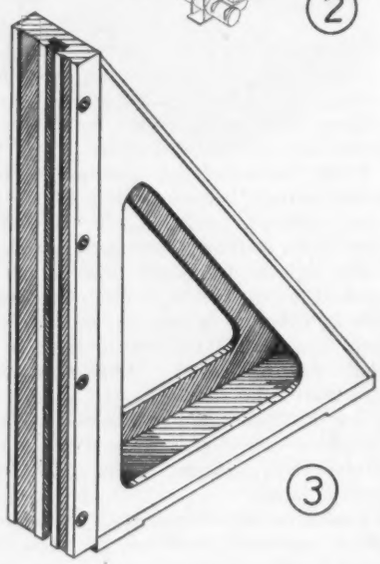


Tooling Ways

An accurate and efficient substitute for the tooling dock in small scale positioning operations aids in constructing small airplane mockups, jig boring tooling plates, and in setting up panel jigs and fixtures. Adaptable to assembly tooling of light airplanes and automobiles

By THOMAS A. DICKINSON
Consolidated Vultee Aircraft Corp.
San Diego, Calif.



TOOLING WAYS, a new three-dimensional positioning device, is based on the principles of the master tooling dock, which offers a fast and simplified method for constructing tools used in the mass production of aircraft (STEEL, July 24, 1944). Invented by Leland A. Bryant, staff tool engineer at Consolidated Vultee Aircraft Corp., it is used in constructing small airplane "mockups," jig boring tooling plates, and setting up panel jigs or fixtures.

Although the tooling ways was created for the purpose of providing an accurate and efficient substitute for the tooling dock in connection with small-scale positioning operations, its facilities would be entirely adequate for the assembly tooling for structures such as those of light airplanes and automobiles.

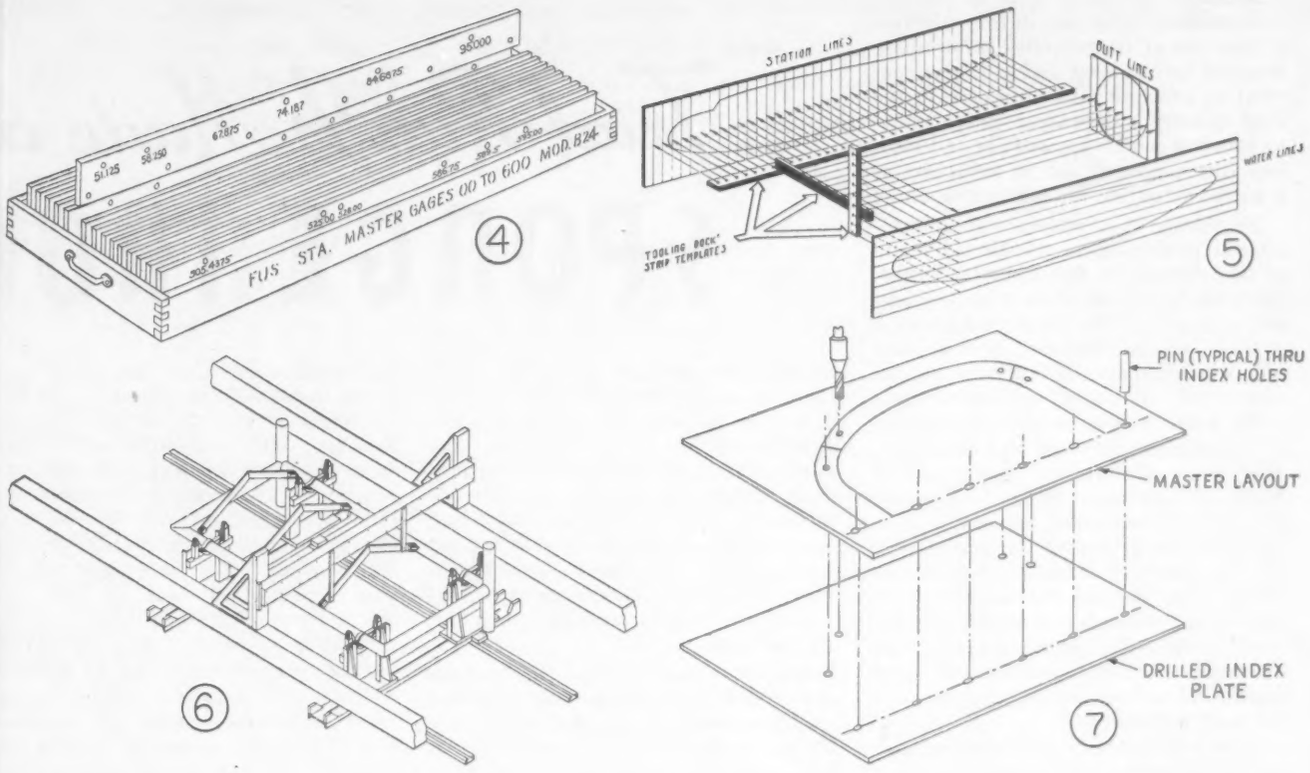
Primary function of the new positioner, shown in Fig. 1, is to reproduce or represent the lines of a grid plane system, so as to locate points in space as determined by a master loft or body plan. This is achieved by positioning a series of "straight edge" members with proper relationship to one another. There are two fixed longitudinal straight edges to represent length dimensions or station lines, two movable vertical straight edges to represent height dimensions or water lines, and one movable transverse straight edge to represent width dimensions or buttock lines. Maximum length of the tooling ways is approximately 60 ft; height, 5 ft, 11 in.; distance between longitudinal straight edges, 9 ft, 1 in. These dimensions are compared with a small helicopter in Fig. 2. Details at upper right and lower left show how parts would be laid out in accordance with the lines of a grid plane system in a master loft.

The longitudinal straight edges are fixed in a horizontal position above the surface of the floor by means of a steel supporting structure, which is fastened to the ground with bolts; micrometric adjusting screws make it possible to align these members in true parallel relationship by means of electrically-energized wires, an electronic mercury level, and master gages. Each vertical straight edge comprises one side of an angle block, which may be moved to any desired position on either longitudinal straight edge; and the transverse straight edge is an individual member, which may be positioned at any height on the vertical straight edges.

An angle block providing a vertical straight edge, shown in Fig. 3, has a T-slot and a series of 0.500-in. diameter holes evenly spaced in a single side at 10-in. intervals to denote grid line locations. These holes are numbered for reference and identification; and due to the accuracy of their locations, they are used as the basis for all positioning.

In addition to the grid holes, there are two features common to all of the straight edges: (1) Each has a ribbed working surface which has been carefully machined and then scraped or ground to reduce surface irregularities; and (2) each has a T-slot running its full length for use in clamping certain accessories. The lengths of the straight edges determine the working capacity or size of the tooling ways; and because of machining limitations, it has been found advisable to make the straight edges in units of not more than 20 ft (even though their total lengths may be appreciably greater).

Either "strip templates", Fig. 4, or microbar-type location gages may be used to provide dimensional control for establishing the positions of the movable straight edges. When speed alone is the most essential tooling requirement, the



microbar is used but, when strict parts interchangeability is necessary, or when a number of duplicate jigs or fixtures must be produced, the strip templates are preferable. Fig. 5 indicates the functions of the strip templates. Holes in the templates establish station, water and butt line locations.

Strip templates are 51 x 2 x ⅜-in. cold-rolled strips of steel. In one margin of the individual strip, 0.500-in. diameter reamed holes are jig-drilled at 10-in. centers to match the grid holes in a straight edge, upon which the strip template is mounted by means of ground pins. In the opposite margin, holes are jig-bored to the precise offsets called for by the basic dimensions of the airplane or part to be constructed.

The number of strip templates required for a given tooling program is proportional to the overall length, breadth, and height of the article to be constructed. The templates are identified and classified by stencil markings, and may be stored in an ordinary filing cabinet.

It has been found economical to utilize a microbar location gage in place of strip templates, due to the fact that a single microbar can be used for all straight edge positioning. However, the microbar is not as dependable as a strip template because it must be reset manually for each positioning operation—and this, of course, brings human fallibility into the work.

For ordinary positioning operations, only 10 simple steps are required to utilize the tooling ways. They are:

(1) A jig or fixture frame is moved into the area between the longitudinal straight edges.
(2) The frame is positioned by means of "loading rails" and supporting devices attached thereto, as shown in Fig. 6. Here locators are positioned on a "picture-frame" fixture in the tooling ways.
(3) A strip template or microbar is used to locate fittings, which will establish station locations when fastened to the "T" slots of the longitudinal straight edges with appropriate bolts. (Note: The same strip template is used for finding identical station locations on both longitudinal straight edges.)
(4) The jig or fixture frame location is tool proofed.
(5) The angle blocks are moved to the fittings which locate the first station on the longitudinal straight edges; and, when the blocks have been attached to the fittings, the positions of the vertical straight edges are firmly and accurately established.
(6) Strip templates are used to find water line locations, so that fittings may be positioned on the vertical straight edges (i.e., by means of T bolts in the corresponding slots), and the transverse straight edge is fastened to the vertical straight edge fittings.
(7) A strip template is used to find a butt-line location on the transverse straight edge, and at this point a dummy locator is positioned to establish the third dimension in space.
(8) A jig or fixture locator is positioned on the dummy locator.
(9) The entire set-up is tool-proofed.
(10) The locator is mated with the jig or fixture frame by pouring molten Cerromatrix (or equivalent material) into a pot which is attached to the frame so as to surround the locator base.

These steps are repeated as necessary at each following station until the jig or fixture is complete. All steps may be performed in rapid succession in the course of a few hours by semiskilled workmen.

An index template, shown in Fig. 7, generally is used for positioning contour locators in the third dimension and to establish the relationship between tooling holes in each part to be located in the assembly fixture and the basic grid lines. This template is made of ⅛-in. sheet steel of proper height and width as required for different fixtures in accordance with the lofting information on a master layout. Therefore, it might be called a "metal layout" of the body plan, except for the fact that tooling holes are superimposed rather than contour lines. By the photoprint process, the master metal layout is reproduced on 1/16-in. steel template stock, which can be used for further tooling purposes, and the result is known as the "master tooling layout." Individual reproductions of the master tooling layout are superimposed over pins inserted in co-ordinating holes at grid intersections on an otherwise blank index template, and these are stack-drilled at each of the tooling hole locations so as to transfer the exact locations of the tool holes to the index template.

Each index template has grid lines on 10-in. centers and co-ordinating holes reamed to 0.500-in. diameter. Accordingly, the master index drill bar is used at the intersection of the grid lines with the vertical center line of the airplane in the case of a fuselage, and on the wing reference plane in the case of an airfoil; and corresponding index holes, drilled in the individual master tooling layouts (loft reproductions), provide a means of co-ordination with the master

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Trial Run Is Made at
SPONGE IRON

SPONGE iron is a form of metallic iron resulting from the direct reduction of iron ore at temperatures below those required for smelting and is porous and open in structure. Its utilization in the steel industry is dependent on the extent to which it can be successfully and commercially produced and its suitability as a partial substitute for pig iron or scrap.

No sponge iron project was in commercial production in the United States at the outbreak of the war. In August, 1942, the Republic Steel Corp. submitted a project to the Steel Division covering an experimental iron ore reduction unit which appeared to offer reasonable chance of successful operation, especially since it was to have the benefit of (a) possibly the best and most suitable grade of iron ore in the United States, (b) the latest design and equipment for ore reduction, (c) readily available coke oven gas, (d) the engineering, metallurgical and operating organization of Republic and (e) the benefit of experienced, independent engineers and metallurgists. This project was approved by the Steel Division and recommended by the War Production Board for government financing.

This experimental ore reduction unit, sponsored by the War Production Board and financed by the Defense Plant Corp., is located at the plant of the Republic Steel Corp., Warren, O., and will be operated by Republic. The process used is known as the Brassert-Cape low-temperature gaseous reduction process. The plant is designed to operate continuously 24 hr per day and 7 days per week and produce 100 net tons of briquettes per 24-hr day or 35,000 net tons per year.

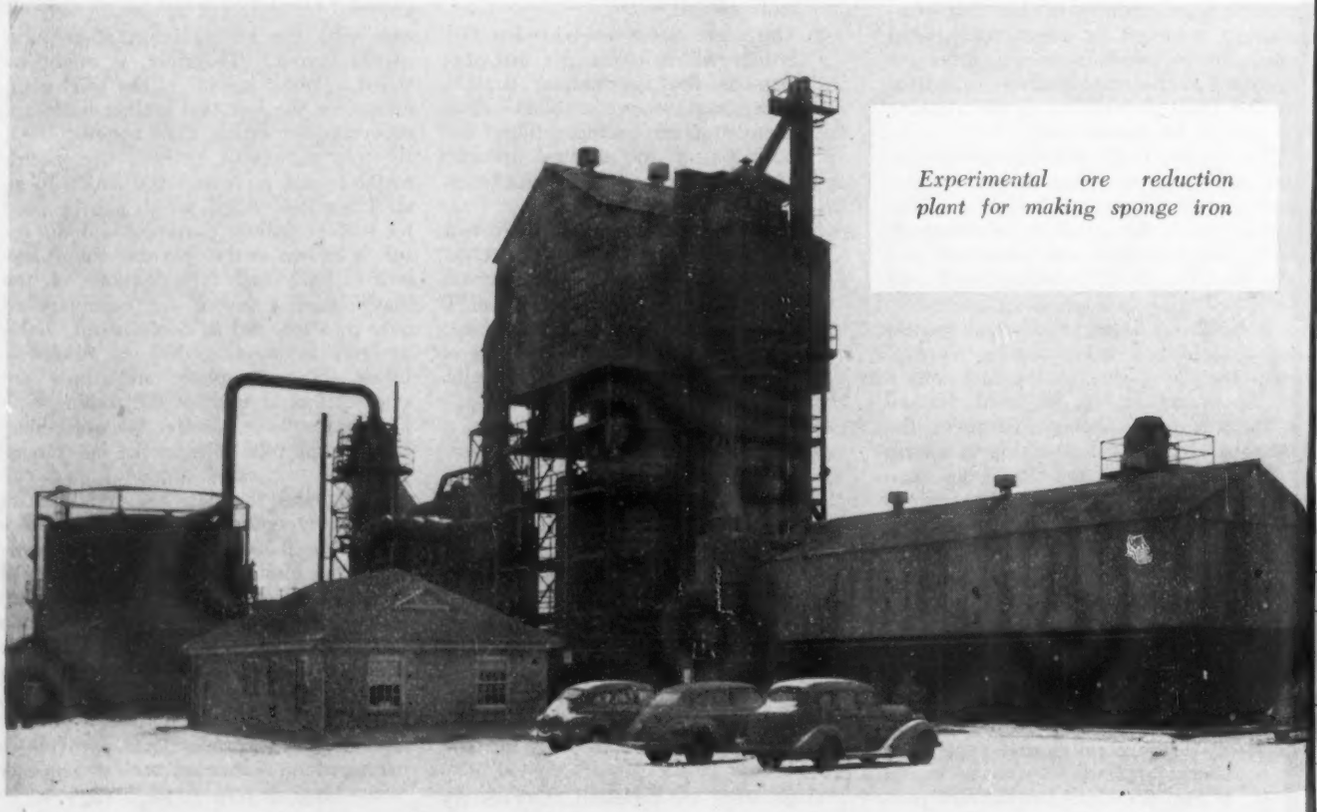
Purpose of Project: In the summer of 1942, the shortage of suitable steel scrap for use in the production of steel in electric furnaces became acute. The Republic Steel Corp., realizing the gravity of this situation, saw, in the proposed sponge iron process, a reasonable opportunity to secure an alloy-free scrap, which should be suitable for use in its electric furnaces at Canton, O., where high-grade electric steel is being produced for highly important products for war.

Another reason for the construction and operation of this unit is to better furnish answers to the pertinent points relative to the possible commercial production of sponge iron, such as: (a) Type physical characteristics and chemical analysis of the iron ore most suited for the production of sponge iron; (b) feasibility of the production of sponge iron using low temperatures and using the hydrogen component of coke oven gas for reduction; (c) proper metallurgical operation of the plant; (d) cost of production; (e) investment in plant; and (f) the utilization and commercial value of sponge iron in the steel industry.

Ore and Fuel: The ore used is fine high-grade magnetite concentrate produced from the low-grade magnetite iron ore mines in New York State, owned by Republic. This concentrate will analyze, on a dry basis, approximately 68.5 per cent (or 94.5 per cent iron oxide in the form of magnetite) and 5.5 per cent gangue material of which about one-half will be silica. The phosphorus and sulphur contents will both be low. This ore is particularly desirable for the production of sponge iron due to its physical characteristics and its chemical analysis. It is a fine-sized material, which is essential for this type of operation and is also unusually high in iron content. It is low in silica content which is important inasmuch as no gangue material is moved in the reduction.

The fuel used for reduction is coke oven gas from a new coke plant. This gas contains about 53 per cent hydrogen and 28 per cent methane, is free from tar products, and is relatively low in sulphur content. The process utilizes principally the hydrogen component of the gas.

Equipment: The accompanying photograph and diagrammatic sketch show



Experimental ore reduction plant for making sponge iron

Experimental ore reduction unit sponsored by War Production Board and located at Warren, O. plant of the Republic Steel Corp., produces 400 tons of product. History, description and status of project taken from report by W. A. Hauck of Steel Division are presented in detail

PLANT

the location of the following equipment at the ore reduction unit:

Ore Handling Equipment: Track hopper, apron feeder, conveyor belt, elevator rotary ore dryer, vibrating screen.

Reduction Furnace: 12-hearth Herreshoff roasting furnace, 52 ft high and 22 ft in diameter.

Gas Handling Equipment: Two iron oxide desulphurizing units, heat exchanger, preheated gas washer precipitator, gas surge tank. Auxiliary equipment includes a gas booster pump and two centrifugal gas fans, gas mixing station.

Briquetting Equipment: Set of water-cooled rolls enclosed in a gas-tight housing, quenching tank, conveyors for dewatering and conveying briquette bins.

Material Flow: Ore is fed from the track hopper to the rotary dryer. This dryer removes the excess moisture from the ore so that it will be free flowing for suitable charging in the reduction unit. The dry ore then passes over the vibrating screen where tramp iron and extraneous lump material is removed. It is then delivered to the ore storage bin and fed at a definite rate by means of a screw conveyor into the top of the Herreshoff furnace.

The function of the Herreshoff furnace is to heat the ore to the desired temperature and to effect the reduction of the iron oxide to metallic iron. The ore moves continuously through this furnace dropping from one hearth to the next lower hearth. The stirring and the horizontal movement of the ore is accomplished by rabble teeth on rabble arms revolving horizontally with the center shaft of the furnace. As the ore descends through the upper hearths, the remaining moisture in the ore will be driven off and the ore heated to the desired temperature by the sensible heat in the uprising stream of reducing gas, i.e., the preheated coke oven gas entering the furnace. On the lower hearths the iron oxide in the ore will be reduced to the metallic state or hot sponge iron, primarily by means of the hydrogen component of the reducing gas.

The hot sponge iron will be discharged from the bottom hearth of the furnace through a connecting chute into the briquette press where the material will be compressed into briquettes approximately 7½ in. long, 6 in. wide and ¾-in. thick. This work is done at low pressure and in a reducing gas atmosphere to prevent reoxidation of the metallic iron. The briquettes will then be quenched in water and conveyed to the briquette bins for shipment. These briquettes will have a specific quantity approximately one-third to two-thirds that of steel.

Gas Flow: The incoming coke oven gas from the main gas line will pass through the two desulphurizer units where the sulphur will be reduced to below 10 grains per 100 cu ft to minimize the contamination of the sponge iron product with sulphur. It will then pass through the heat exchanger and preheater where it will be heated to the desired temperature, approximately 1300° F or higher. This preheated gas will then enter the Herreshoff furnace in one or more of three ways: Entering underneath hearth No. 12, rising through slotted openings in this hearth and then passing up through the movable bed of ore resting upon the hearth; by openings in the periphery of the furnace on three of the lower hearths, and by passing through a hollow compartment of the central shaft and then through the hollow rabble arms on the lower hearths, the gas being discharged as jets impinging directly upon the bed of ore. The gas, rising upward through the furnaces, will reduce the iron oxide to metallic iron on the lower hearths and will dry and preheat the ore on the upper hearths. Upon leaving the top of the furnace, the spent gas will pass through the heat exchanger where it will give up a major part of its heat to the incoming gas and will then pass through the gas washer and a precipitator for cleaning and cooling. The gas will then go to the gas surge tank from which it will be returned to the main gas line by means of a constant displacement gas booster pump. Upon entering the main line the gas will flow to the gas stabilization station where it will be mixed with predetermined amounts of natural gas or air, or both, before continuing to the steel mills where the gas is used for combustion purposes.

Product: The shipping product is not a true sponge iron but will be dense

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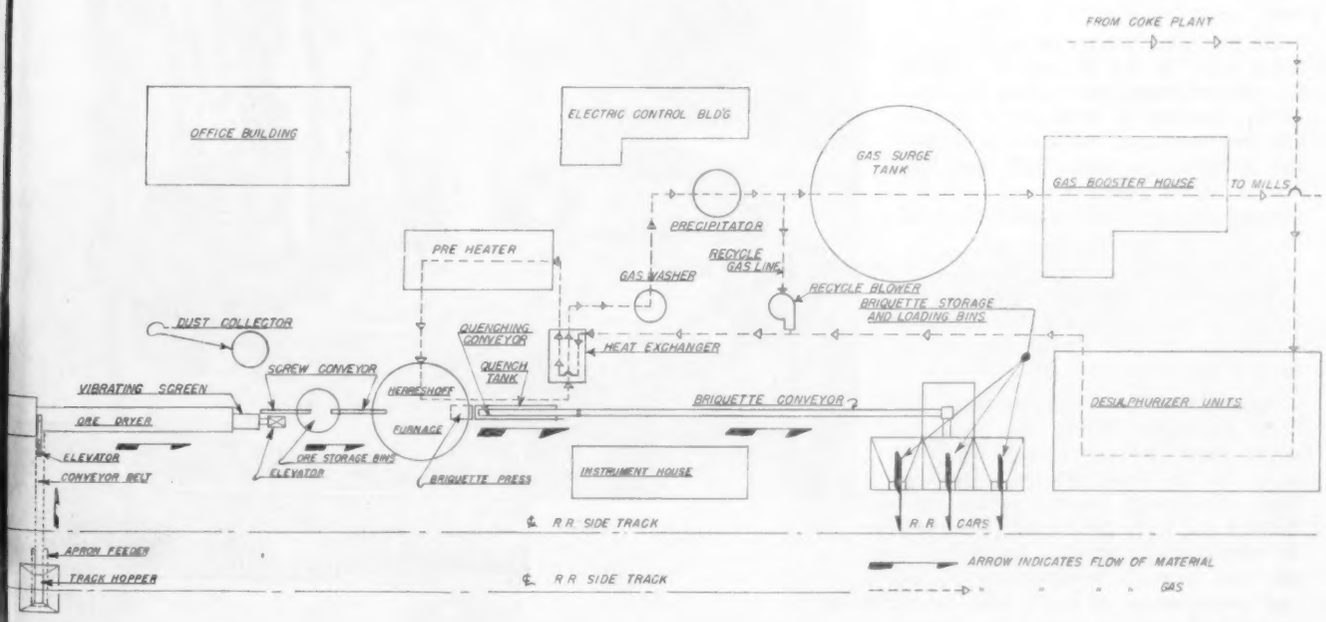
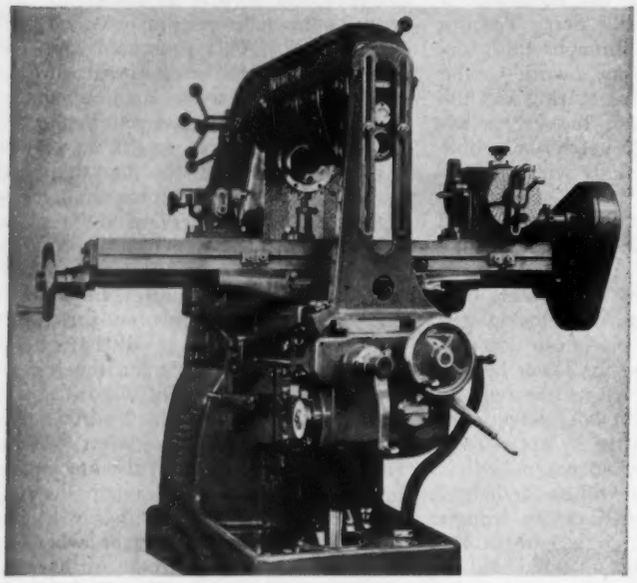
Diagrammatic chart showing flow of iron ore and coke oven gas



UNIVERSAL Dividing Head

. . . for milling machines maintains original accuracy in circular spacing for years



RIGID optical inspection check of a universal dividing head for milling machines, said to maintain original accuracy four or five times as long as conventional dividing heads, insures an accuracy for circular spacing not to exceed plus or minus 1 minute of arc at any setting. Retention of original accuracy is stated to be important in a milling machine dividing head, as it should be capable of producing accurate divisions of circular spacing even after many years of use.

Longer life, particularly important when machines are constantly used with dividing heads set up for spiral cutting, is attributed to the use of a new type of gearing. The cone-drive gearing, made by Michigan Tool Co., Detroit, resembles an hourglass worm and wheel. It is produced, however, by an entirely different process which affords a large area of contact between teeth of pinion and gear instead of the usual line contact. More teeth also are engaged.

Effect of this design is to distribute the load over a larger area per tooth and also over more teeth, resulting in much lower unit loading of gearing with decreased wear. An added advantage of the design is that the meshing gearing carries lubricant into the space between the teeth rather than forcing it out—a tendency of some gearing.

This dividing head, made by Modern Tool Works Ltd., Toronto, is said to be especially suitable for tool plants which manufacture spiral or helical milling cutters, reamers, etc. It appears in the illustration mounted (at right) on a Modern Tool Works Ltd., model 2-MU full universal milling machine. Change gears for spiral or helical milling are provided for mounting in the power take-off gearbox, also at right. Ample sized antifriction bearings are provided throughout. The pinion shaft is mounted on double-row ball bearings at both ends.

Multiple-head machines reduce fixture costs to minimum in

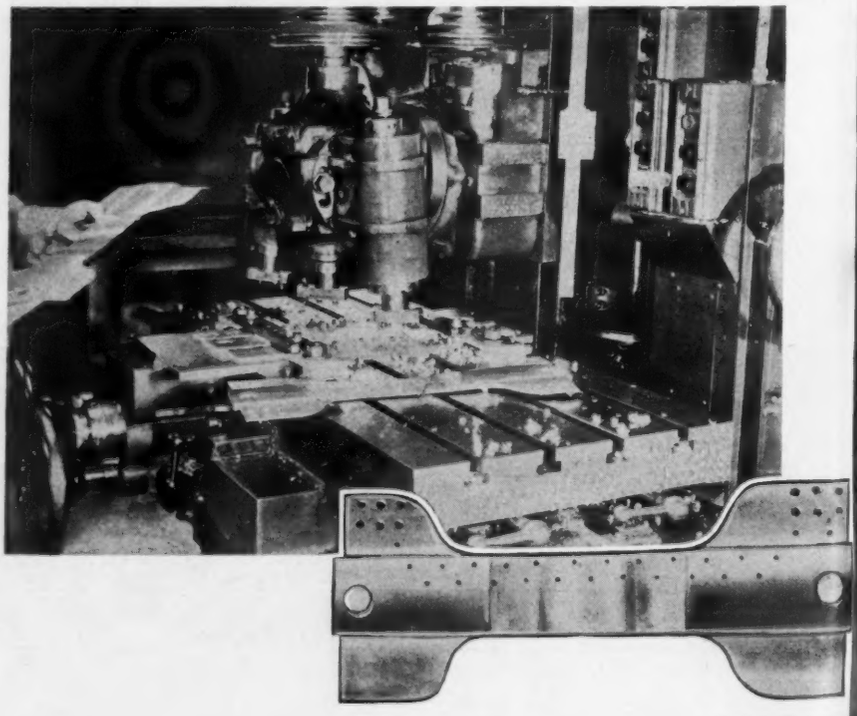
Machining Aluminum and Magnesium

RAPID and accurate machining of aluminum and magnesium is facilitated at Aircraft Products Mfg. Corp., Des Plaines, Ill., by a battery of special machines with versatile, specialized, interchangeable attachments that eliminate many tools and fixtures used in usual machining processes. These save up to 50 per cent or more of tool and fixture cost.

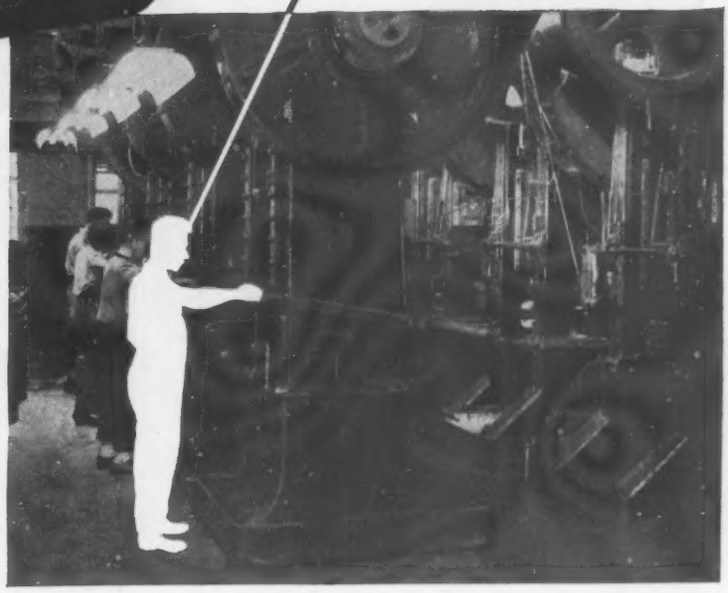
On the aluminum casting shown at lower right in the illustration, elimination of two setups, two milling fixtures, a 12-in. reduction in table travel disance, and two handlings, has made a substantial reduction in cost. Part runs from 100 to 10,000 pieces or more, both simple and intricate, can be processed readily.

For aluminum and magnesium parts, a sequence of operations such as surfacing, boring, milling and drilling can be carried out at one setting without disturbing the piece or holding fixture.

Special machines built by Hack Machine Co., such as the one shown in upper view, permit mounting of four heads on the master head at the same time. This makes possible multiple production of four pieces simultaneously. By setting up the machine instead of the job, and through co-ordination of special combinations of heads with vernier scales built into the machines, precise position of the part in relation to cutting tools is possible in all directions. This method provides jig bore precision between related surfaces whether drilled, slotted or milled. Inaccuracies resulting from transfer of parts from jig to jig are eliminated. This permits working to very close tolerances not possible when operations are done individually. Extremely difficult jobs not practical with usual machine tool equipment are handled accurately and speedily.



How many EXTRA MAN HOURS are your tools costing you?



Here's how to find out!

Men stand idle at machines every time a tool is reground or replaced. Time is wasted in the toolroom and in heat treating. But now there is a way to stop the costly loss from tools that wear too rapidly or fail prematurely. Use these three easy *job analysis* steps now.

1. Double Check Each Job At The Start!

Hundreds of Tool Engineers are using the Carpenter Matched Set Method to get tools that stay on the job longer. This method saves man-hours at machines, in the toolroom and in heat treating. In easy steps it shows which tool steel will give best results on each job. To put it to work on your jobs, ask for the Carpenter "Matched Tool Steel Manual". It is a 167-page book (Free in the U.S.A.) that will give you down-to-earth answers to your tooling problems.

2. Follow Up With Heat Treating "Know-How"

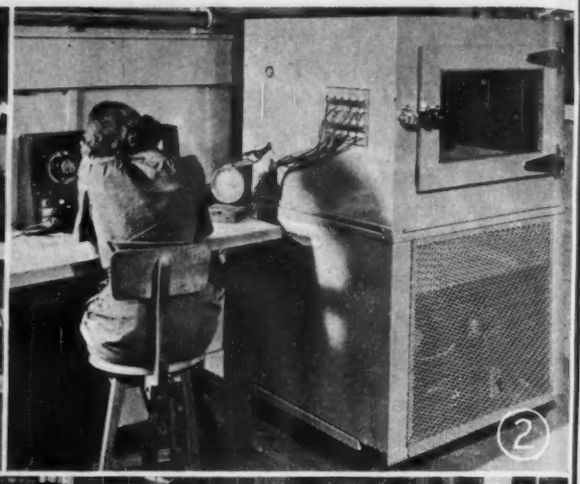
And here is your insurance that proper heat treatment will back up your work in designing and making tools. The Carpenter Heat Treating Guide is a handy slide chart that gives forging and normalizing heats, annealing and hardening treatments, recommended drawing ranges for all the Matched Tool Steels. Plus tips on quenching, drawing and furnace atmospheres. Use the new Heat Treating Guide to reduce down time, save man-hours and cut costs.

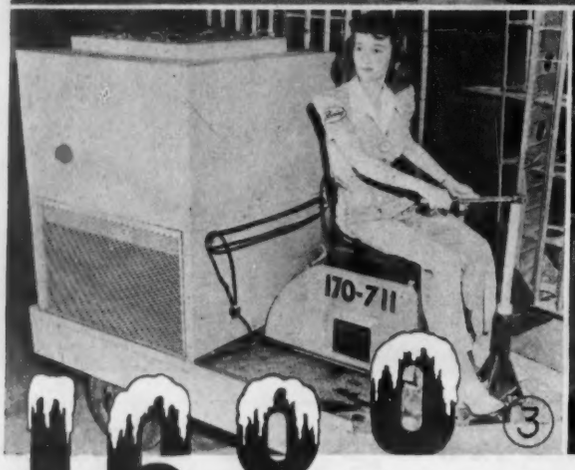
3. Check Each Tool On The Job!

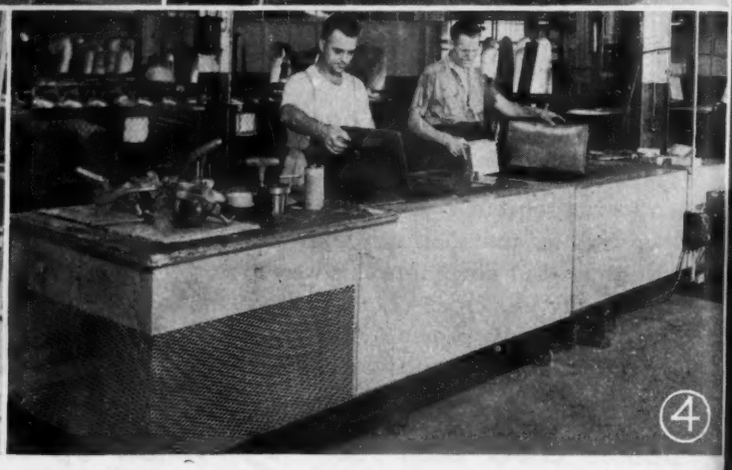
How many pieces does each tool produce between grinds? Which tools fail too soon in service? Answers to those questions give you a yardstick to use in improving tool performance. And for personal help with your job analysis plan, call your nearby Carpenter representative. He knows tool steel from A to Z and can provide real engineering help. Get in touch with him for practical help on your jobs.

The Carpenter Steel Company
139 W. Bern St., Reading, Penna.

Carpenter MATCHED TOOL STEELS







168° Below Zero

Great expansion in application of "cold" involves much special equipment to meet the many different service requirements. Lansing plant features a variety of machines to handle metal-working in production of "cold" units

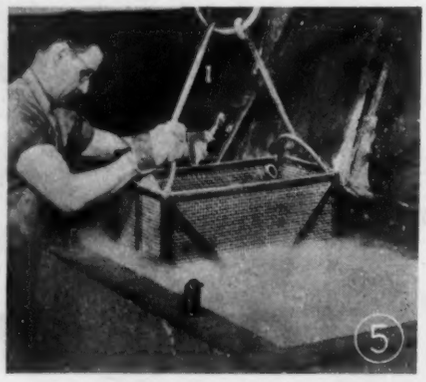
By G. W. BIRDSALL
Associate Editor, STEEL

DEVELOPMENT of mechanical refrigeration units that efficiently produce and hold temperatures down to 168° F below zero has resulted in a tremendous increase in the number, size and use of such units.

Perishables: The new and rapidly growing frozen food industry is made possible by the advent of this low-cost mechanical refrigeration now widely used in quick-freeze plants, locker storage plants, and the like.

Long distance transportation of perishables is just coming into its own. Here, newly developed "holdover" plates afford economical refrigeration for trucks at less than 10 cents a day since refrigeration plates are hooked to plant refrigerant lines at night to freeze an eutectic solution to a solid mass of flint ice. All the next day, this then absorbs heat from meats, dairy products and other food to save tremendous amounts in reduced spoilage. One user reports saving of $10,500 in less than 6 months, another saves at least $250 a week. For long hauls, small engine driven compressor units mounted on the truck body supply continuous refrigeration to the load.

Mechanical refrigeration units may employ 1, 2 or 3-stage motor-driven compressors, an expansion coil or plate where the heat is absorbed, and a radiator to dissipate heat removed from the load.



Engineers of Kold-Hold Mfg. Co., Lansing, Mich., prominent producers of such equipment, have developed a technique for fabricating integral, continuous line, refrigerant expansion plates to form complete cabinets, liners and shelves with all refrigerant joints eliminated and without interruption to the continuous flow of refrigerant. This important development is pictured and the production of such items illustrated in accompanying Figs. 6, 7 and 8. Such units absorb heat rapidly from their entire surface, thus providing quick action in freezing foods and in similar applications where maximum rate of heat removal is an essential factor.

The war has focused attention on another phase of "cold" production and control—in testing and development work. Manufacturers of aircraft and communications equipment that must operate in extremes of temperature and humidity require some economical and

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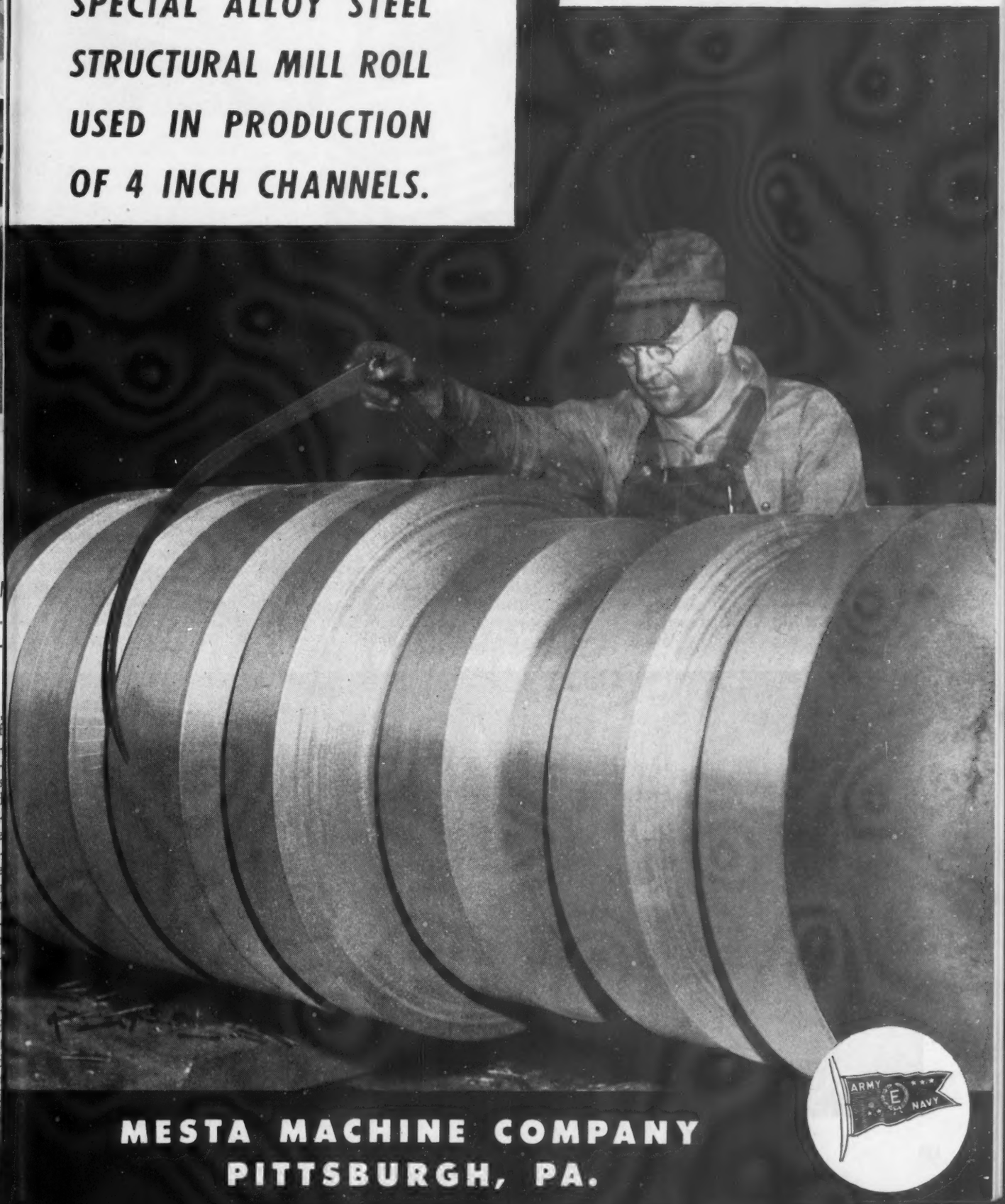

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MESTA MACHINE COMPANY
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effective method of duplicating these service conditions in their own plant to be certain of satisfactory performance in the tropics, arctics and stratosphere. Often such tests involve provision for simulating operation at high altitude—low atmospheric pressure as well as low temperature. Many units like that in Fig. 1 are built to operate at a partial vacuum ranging down to less than 1 in. of mercury, at temperatures from 176 above to 94° F below zero, at relative humidities up to 95 per cent.

Fig. 2 shows a 5-cu ft unit used for testing instruments at 70° F below zero.

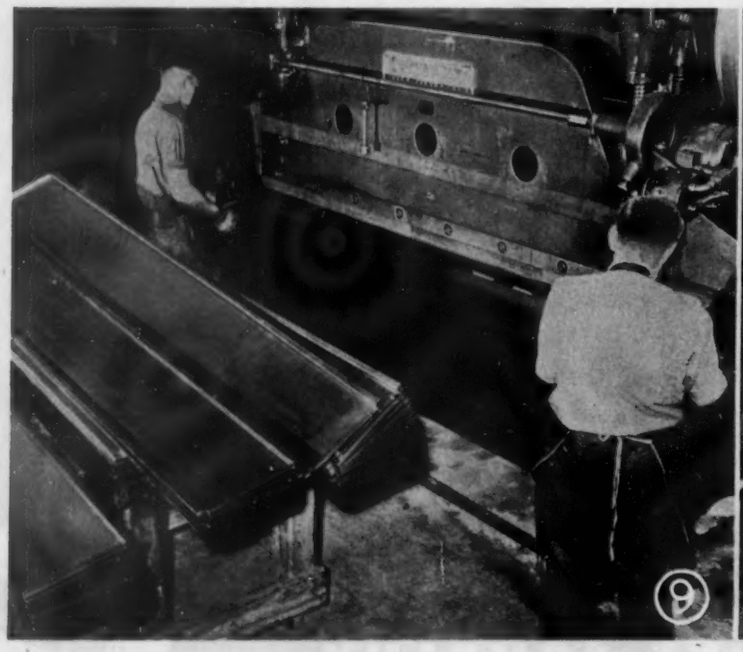
Rivet Storage: Metalworking industries have found refrigeration equipment more and more useful. Aircraft manufacturers use sub-zero machines to reduce temperature of a load of heat-treated aluminum rivets very fast and to maintain at 45° below zero to preserve the rivets in a soft state just as they come from the heat-treat furnace and quench bath. This effectively prevents age hardening until they are driven in the plane's structure.

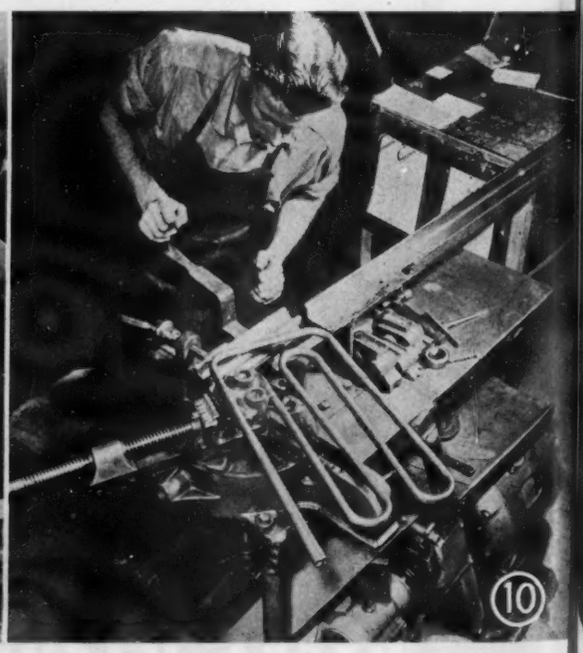
No. 3 shows a Kold-Hold refrigeration unit mounted on a battery-driven industrial truck for delivering rivets to work stations around the plant at the same time keeping them cold. Whenever the truck is stopped, the compressor motor is plugged into any convenient electric outlet through the cable seen coiled back of the driver.

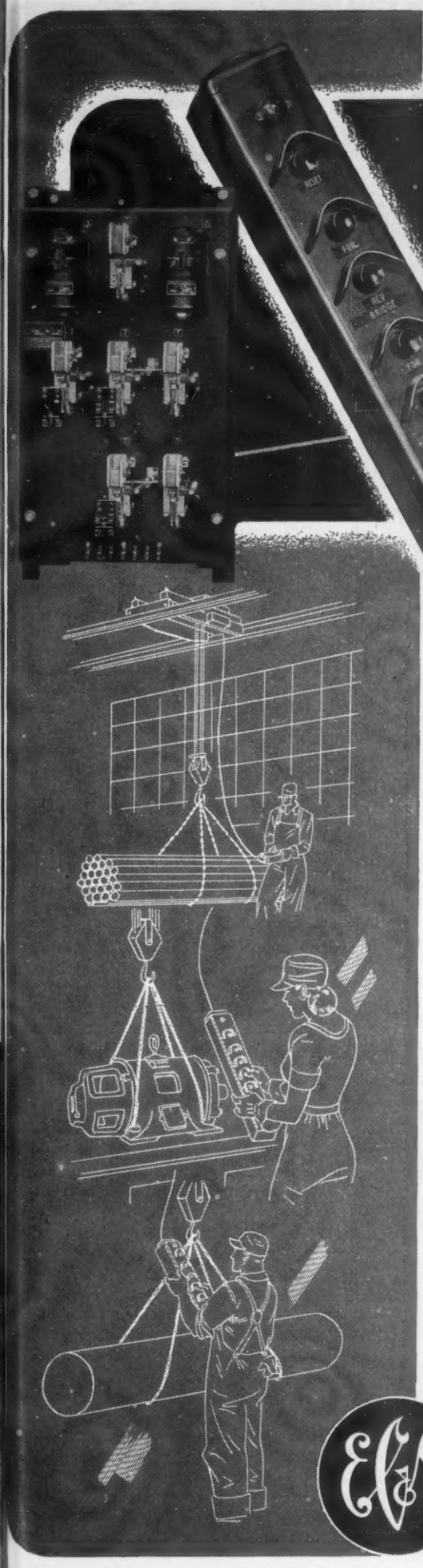
Expansion and Shrink Fits: Most any place where a close press fit is required, the assembly can be made quicker and better by use of expansion and shrink fits, point out Kold-Hold engineers. Instead of heating to get the temperature differential required for a shrink fit, often it is preferable to chill the mating part to obtain the same temperature differential, producing an expansion fit which does the job equally as well as a shrink fit. This system avoids heating certain steels and aluminum which may easily be damaged by the elevated temperatures required for a shrink fit.

Fig. 4 shows the shrinking of hubs for propellers at 45° F below zero in a large multiple refrigeration unit in the plant of a prominent aircraft parts manufacturer. Such chilling makes heating of the mating part either unnecessary or else it can be reduced to a low value.

Aging Metal Parts: For years it was customary to let large castings and many other parts "age" to dissipate locked-up stresses and to produce a stable metallurgical structure by exposing them to the weather. Now production speeds demand faster methods, so engineers have gone to the use of controlled heating and chilling cycles. For such work, standard units go to 150° F below zero and have shown temperatures down to







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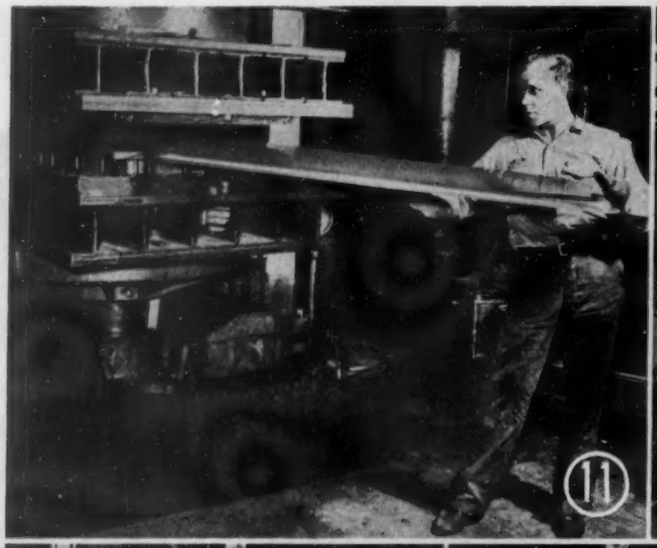

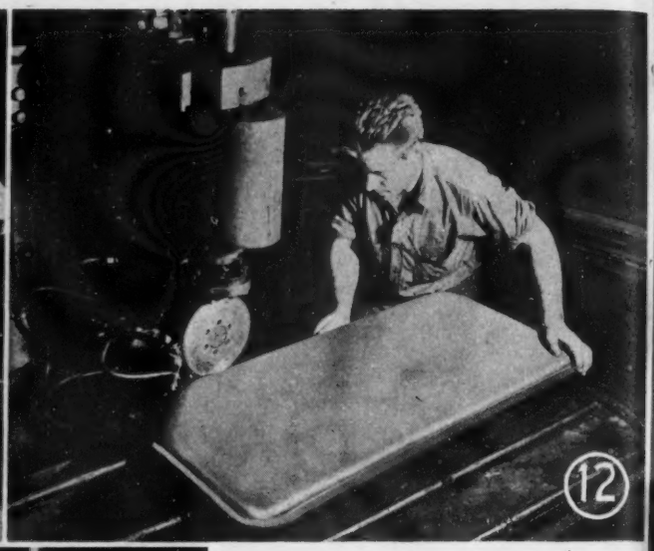

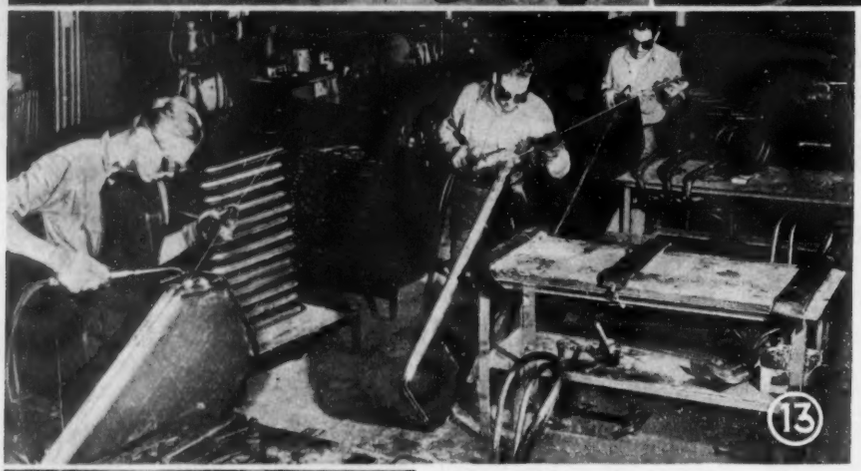

168° below zero on performance tests.

A simple cycle of moderate heat and intense cold, repeated as required, has been found to produce quickly the dimensional stabilization needed in precision measuring instruments and gages. Also dimensional stability is extremely important where parts must have close fits. Such parts are being processed in this manner to great advantage. Fig. 5 shows typical work being put in a chilling unit at 45° F below zero. The

extremely low temperatures down to 150° below zero are used only where necessary because the expense of processing at such temperatures increases much more than in proportion to the working temperature.

Much Resistance Welding: Some of the latest developments in production methods and equipment are found in the Kold-Hold plant. In addition to seam welding around outside flanges of formed sheets to enclose coils and eutectic freezing solutions in construction of the "holdover" refrigeration plates previously mentioned, a heavy duty seam welder is used in making up the "serpentine" plates from formed sheet instead of coils to control the flow of refrigerant.

Figs. 6, 7 and 8 show serpentine type plates. After blanking, one of the flat sheets for such a unit has the serpentine path formed in it by dies on a large hydraulic press. Then the flow of refrigerant through the plate is made to conform to the serpentine path by seam welding in a pattern which seals off all paths except the one desired. Seam welds are made by producing a series of closely spaced overlapping spot welds. Heavy wheel type electrodes are used on the seam welding head, Fig. 12, so a seam weld about ¼-in. wide is produced, forming an effective gas seal.

These serpentine plates can be made to conform to most any shape desired such as the rectangular unit in Fig. 8. This design is an important contribution to fast freezing in preparation of frozen foods.

Gas and Arc Welding, Too: Adjoining serpentine plates are connected together by tubing welded with an oxy-acetylene torch as shown in Fig. 6. External connections are also gas welded as in Fig. 13.

In addition, much welding is done with the electric arc. All structural work is arc welded, including the heavy steel reinforcing frames required for the stratosphere units which operate under a vacuum. Outside air pressure would quickly collapse such units unless strongly reinforced. It is not unusual

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to employ a network of ⅛-in. thick channels on 3-in. centers as shown in Fig. 7. Of course various other spacings and reinforcing designs are also used.

Forming Tubing and Sheet Metal: Fig. 9 illustrates a forming operation in manufacture of a refrigerating plate for a cold storage locker. Here, a large press brake is being used to flange the sheets.

In addition to the serpentine type of refrigerating plate, many units employ tubing to carry the coolant through the plate. In order to distribute the heat absorbing action uniformly throughout the entire surface of such a plate, the tubing must be coiled back and forth, requiring the extensive use of power tube benders, several of which are found in the Kold-Hold plant.

Fig. 10 shows a typical operation on one of these tube benders. Here the workman is just making the final return bend in a small coil.

For the "holdover" units and many others, the coil carrying the refrigerant is then covered by a sheet metal case and the intervening space filled with an eutectic solution having a low freezing point to conduct heat from all portions of the working surface to the coil.

Cover sheet for such a case is being formed on the large mechanical press in Fig. 11. Most of these plates or liners are made from 16-gage hot-rolled steel except a few made from 18 gage. Some also are made from monel and stainless steel.

In Fig 12, the two halves of the enclosing case are being assembled by running a seam weld around the exterior flanges. The coil is inside. In Fig. 13, connections to the coil and to the interior of the case are being gas welded.

All such connections are tested at 300 psi air pressure under water to detect leaks. The 150-below-zero units receive a test at 300 psi.

Insulation: These low temperatures are not maintained economically without exceptionally effective insulation. Fiberglass is employed in various thicknesses for all units except the 150-below-zero ones which utilize a 6-in. blanket of Santocell. Units working at 90 below employ an 8-in. thick blanket of fiberglass.

Outer cases are made from sheet steel, with right-angle flanges at edges which then permit adjoining sections to be connected by running an arc weld around the edges of the flanges. This construction allows a certain amount of "bellows effect" between adjacent panels to accommodate temperature changes.

Doors often require windows for visual inspection during testing work. Such windows are made with multiple layers of glass, each sheet of glass being carefully sealed and separated by a ½-in. air space from adjoining sheets. To prevent condensation, silica jel crystals are sealed in the air spaces separating the glass sheets.

Metal Finishes: The standard finish for this equipment is a gray enamel, baked on in the infra-red unit shown in Fig. 14. Conveyors are employed in the finishing section for handling the work.

Other units are hot dip galvanized, or may be galvanized by spraying on molten zinc or other protective metal covering as shown in Fig. 15.

While a large portion of the plant output is of standardized units, many special ones are always in production for it seems that there are hardly two low-temperature jobs that are exactly alike. This applies especially to the stratosphere units where practically every one is a special design all the way through.

Provision for testing equipment in these units may require an unusual arrangement of thermocouple connections, rotating shafts to supply power or to operate controls on the equipment being tested, coaxial radio cables, high frequency insulation, special provisions against moisture, nitrogen filled leads for high-frequency connections, special controls for temperature, pressure and humidity—recording, as well as indicating, and so on.

Facts and Figures on

Zinc Spraying

AN independent testing laboratory recently completed an interesting study on the characteristics of sprayed zinc. This report, according to L. E. Kunkler, president, Metallizing Co. of America, Chicago, emphasizes that the thickness of the sprayed zinc determines the corrosion-resistant potential of the surface so protected.

When zinc is applied by spraying, almost any desired thickness can be obtained. In contrast, when it is applied by galvanizing or the hot dipping method, thickness is limited as a rule to 1 to 1½ oz per square foot.

In applying zinc by the metallizing method, it is feasible to apply from 4 to 16 oz per square foot and the thickness is based on the potential protection desired. If the amount of zinc per square foot is doubled, the lasting qualities are increased approximately four times. If the amount of zinc is tripled the corrosion-resistant potential would be 16 oz per square foot and the thickrupled, the potential then would be 16 times.

Under severe corrosion conditions, an average coating of 6 oz per square foot is required for adequate protection, while under ordinary or average condition 4 oz of the zinc per square foot will result in approximately 12 to 16 times the life of conventional galvanized surfaces.

Surface preparation for sprayed zinc coating is accomplished by sand blasting at an estimated cost of 6 to 10 cents per square foot, depending upon the conditions in the plant and also whether steel grit or sand is employed.

Metal Cost Moderate

The metal wire cost varies according to the quantities purchased, however, as a general rule, this cost is 22 cents per pound in lots of 2000 lb. Allowing for a small dissipation of the zinc metal through vaporization when the wire is melted and sprayed, the metal cost per square foot for a 4-oz deposits amounts to 6.25 cents.

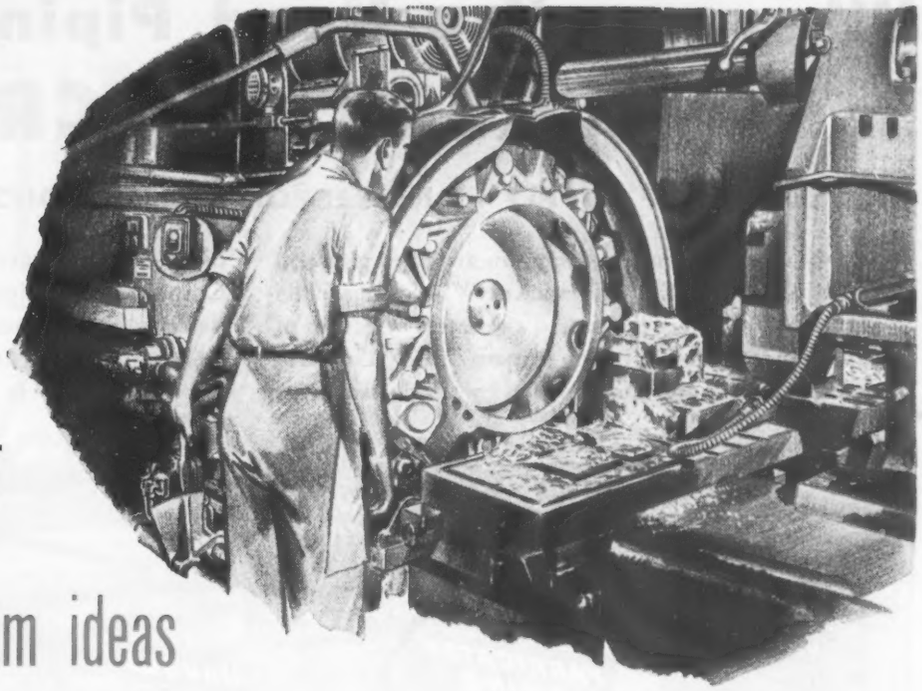
During the spraying operation, based on the foregoing thickness, a normal operator will average 25 lb of metal hourly throughout the day and will cover approximately 100 sq ft. The metallizing gun is capable of depositing considerably more than this per hour, but normal interruptions by the operator account for this lower figure.

The cost of operation for the metallizing gun, including labor, maintenance, gases, air, and the like, will approximate $3 to $4 per hour.

Therefore, the total cost per square foot for zinc spraying, including surface preparation, metal, and gun overhead, will range between 15.25 and 20.25 cents, with an average of 17.75 cents. Some manufacturers using this method on a production basis have been able to lower the cost to 9 cents per square foot, including all essential elements.

Zinc spraying is enjoying increasing acceptance in protection of surface areas exposed to atmospheric corrosion, and it has long been giving added protection against chemical corrosion to vessels of many types. These are only two of many applications which are being used today. The newest application is production metallizing to protect critical parts from corrosion.

Tomorrow's products will utilize the advantages of zinc spraying to add longer life to vital parts and guarantee a surface protection which is absolutely corrosion-resistant.



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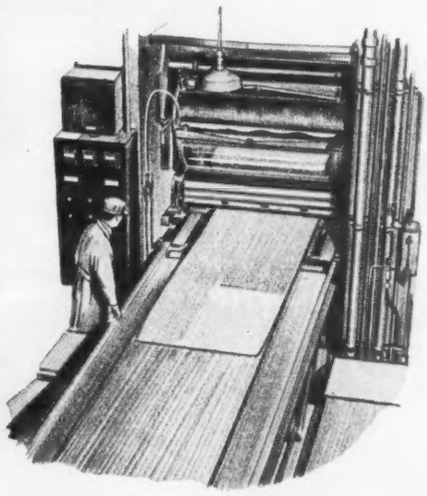

It's only natural that more and more progressive manufacturers think at once in terms of magnesium whenever exceptional lightness becomes a product factor. Based on magnesium's unique achievements in saving weight, power, cost, such thinking is responsible for a steadily increasing output of new magnesium product ideas.

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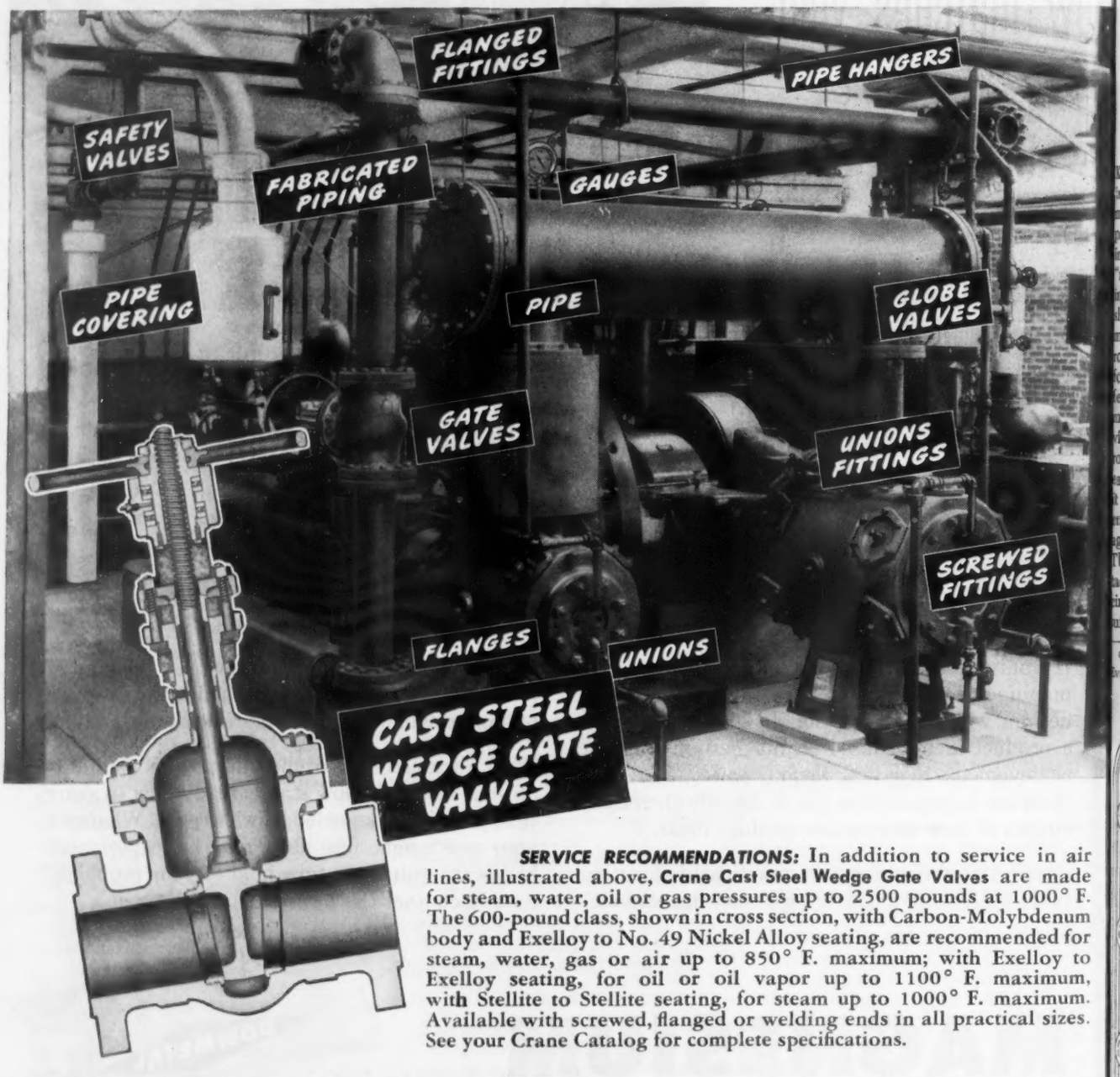

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INTERMITTENT-ACTING MILLS for Rolling Strip

Part II

Evans-type mill is designed to reduce strip between large roll and migratory rolls. Strip is pulled through Kessler-type mill housing large nondriven roll, stationary platen and small rollers. Proposed intermittent-acting mill employs small planetary rolls which circle about large central roll

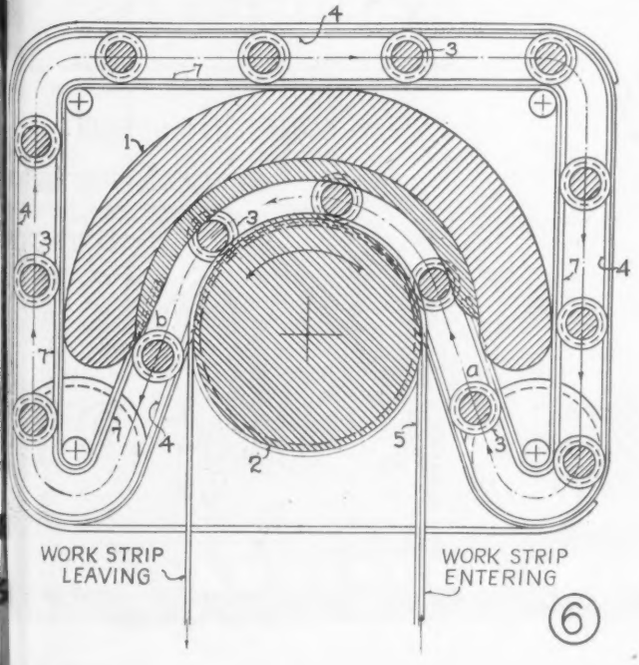
By J. D. KELLER
Associated Engineers
Pittsburgh

A MILL which differs widely from the Krause mill, but nevertheless is also of the intermittent-action type, is the Evans mill[4], shown in Figs. 6 and 7. The principal feature of the Evans mill, and a most ingenious one, is the use of a number of "migratory rolls" 3, which are guided into the space between a horseshoe-shaped or semicylindrical fixed cross-member or anvil 1 and the rotating large roll 2 through which the torque required for rolling is transmitted. The strip is fed in at *a*, between the large roll and the migratory rolls. The semicylindrical anvil 1 acts as the equivalent of a backup roll with respect to the small rolls. As each of the migratory rolls emerges at *b*, it is carried, by means of belts 4 at each end, up and over the top of anvil 1, and again enters the working region at *a*. The backs of belts 4 are pressed into contact with large roll 2 over a portion of its circumference, and they receive from it sufficient traction to cause the small rolls, with the ends of which the belts are in contact and which they press against the guides or stationary track 7, to migrate around the circuit of the stationary track. Various ingenious auxiliary devices are provided for guiding and retaining the migratory rolls in their course and for insuring that they enter at *a* with their axes parallel to that of large roll 2.

For varying the final thickness to which the strip is reduced in the pass, a "gage sheet" 5 of suitable thickness is fed between the work strip and the large roll 2. The gage strip is made of steel having a higher elastic limit than the work strip, so that the gage strip will not be appreciably deformed by pressure transmitted from small rolls through the work strip.

In the modification of the Evans mill shown in Fig. 7, the anvil is made almost a full circle, and is provided with a liner 6 having in it several steps *c*, *d*, *e*, so that several successive reductions are effected during one pass of the strip through the working region from *a* to *b*. There is, however, a limit to the total amount of reduction possible in one pass, for as the thickness is progressively reduced at the various steps, the strip lengthens as shown by the dotted lines, and after the last step the space between the large roll 2

[4] U. S. Patent No. 2,266,418, to Martin E. Evans, Dec. 16, 1941.



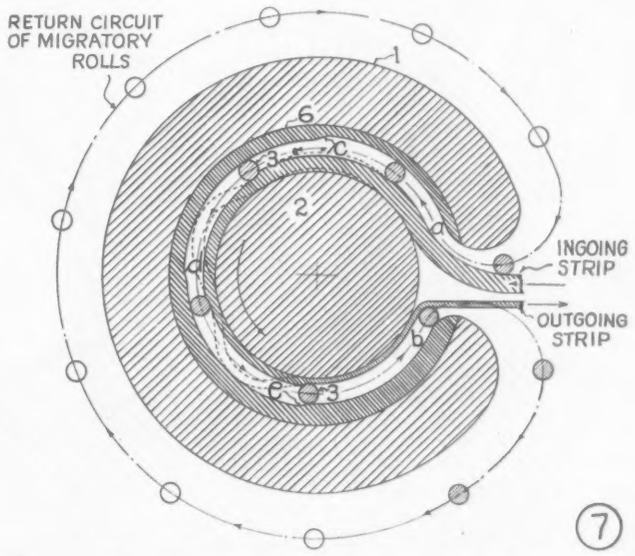


Fig. 6—Evans type mill employs numerous migratory rolls which may be replaced quickly

Fig. 7—Modification of the Evans-type mill

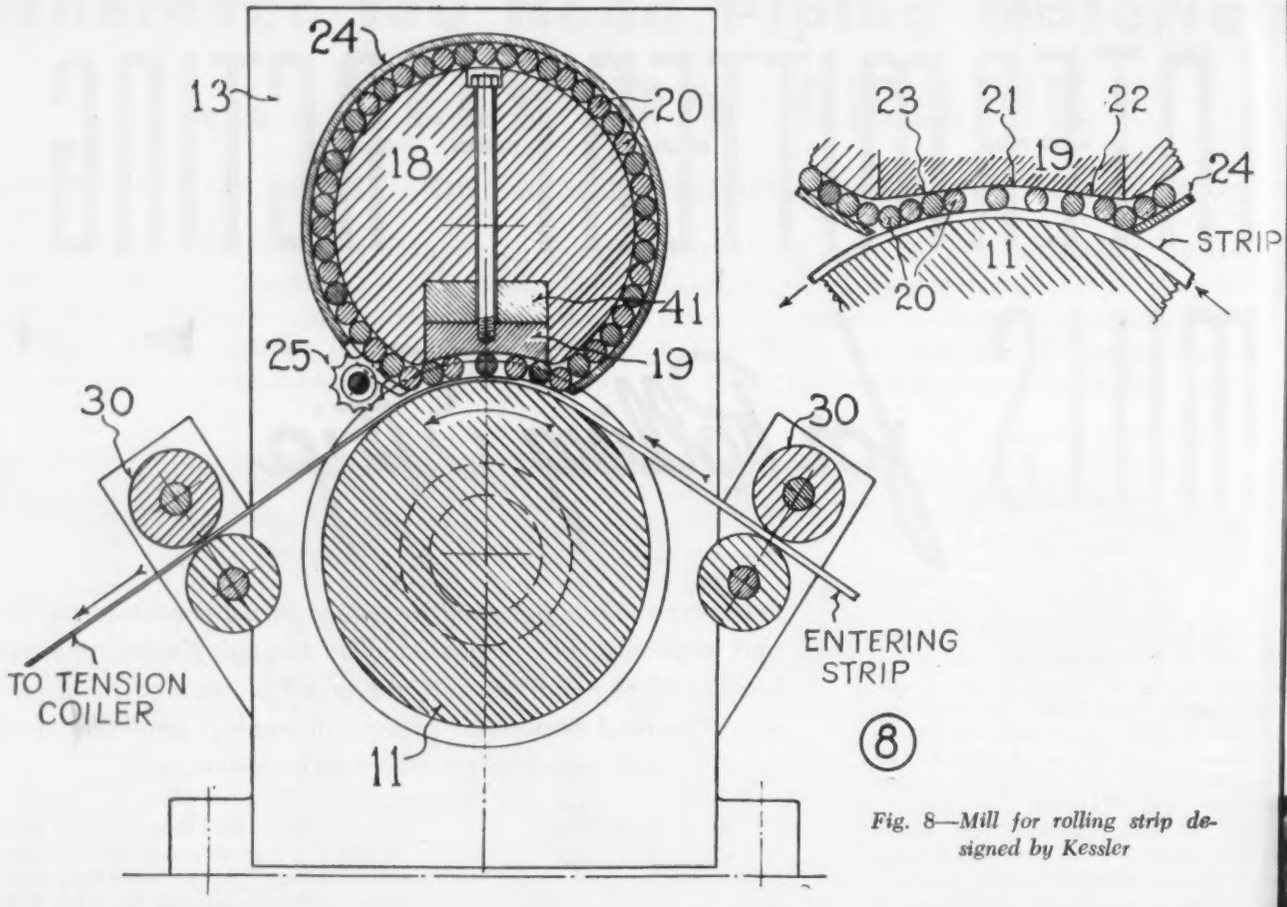


Fig. 8—Mill for rolling strip designed by Kessler

and the anvil might be insufficient to accommodate the lengthened section of strip without its crumpling and jamming. Use of a gage strip would be more difficult in this modification (Fig. 7) and instead, changes of final thickness of strip probably would be effected by substituting slightly larger or slightly smaller migratory rolls 3. Evans makes provision for quick removal and replacement of the migratory rolls.

Involves Delicate Arrangement

It is not known whether the Evans mill has actually been built. One objection raised against it is that the arrangement for guiding and returning the migratory rolls, while undoubtedly ingenious, appear to be rather delicate for mill use, and likely to get out of order easily.

Apparently, one of the earliest designs in which the intermittent-action principle was applied to the rolling o

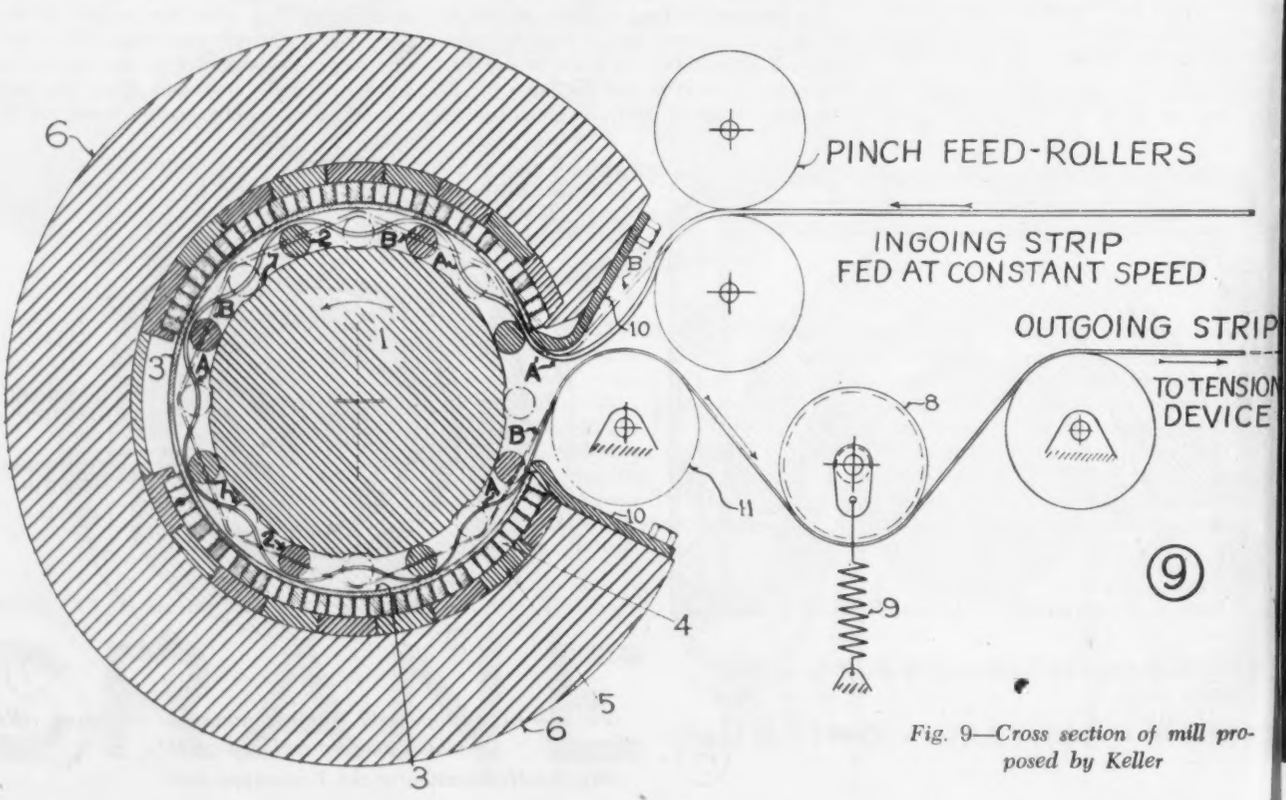


Fig. 9—Cross section of mill proposed by Keller

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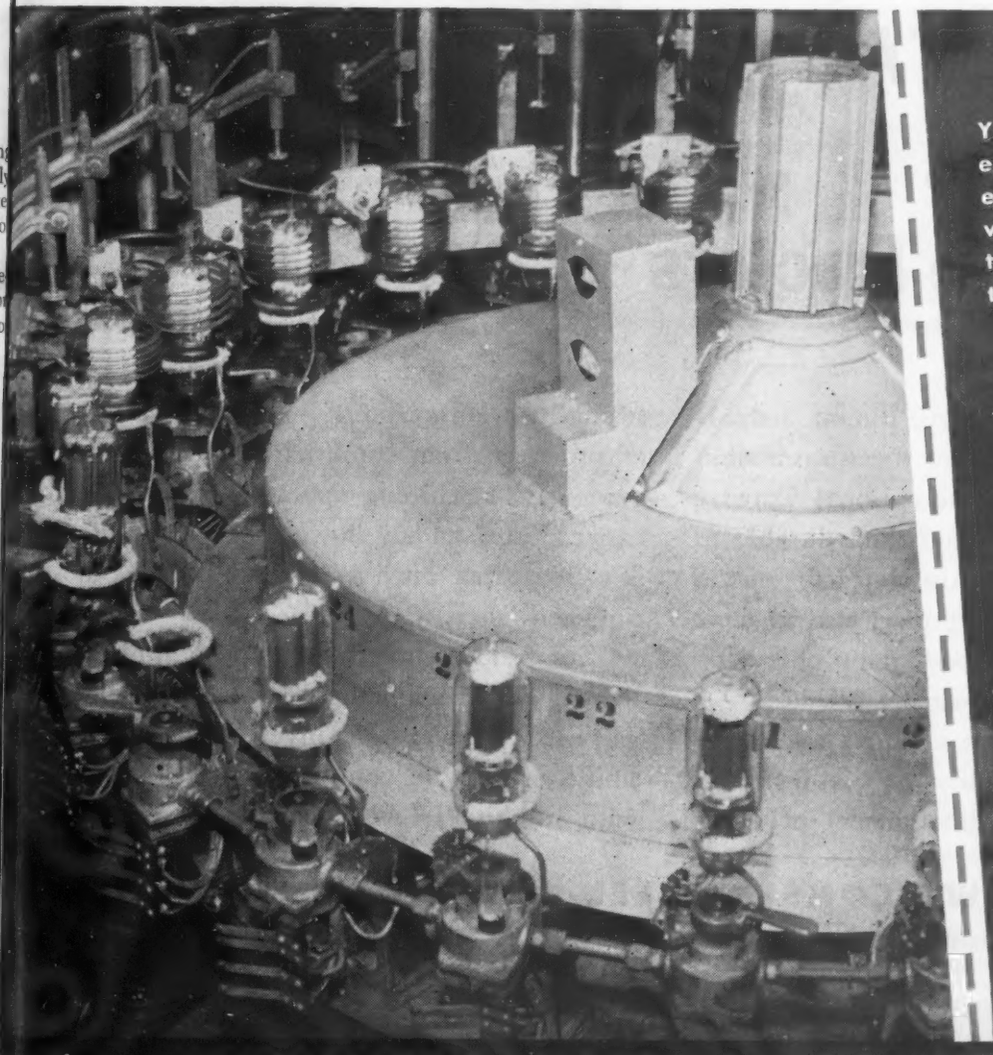

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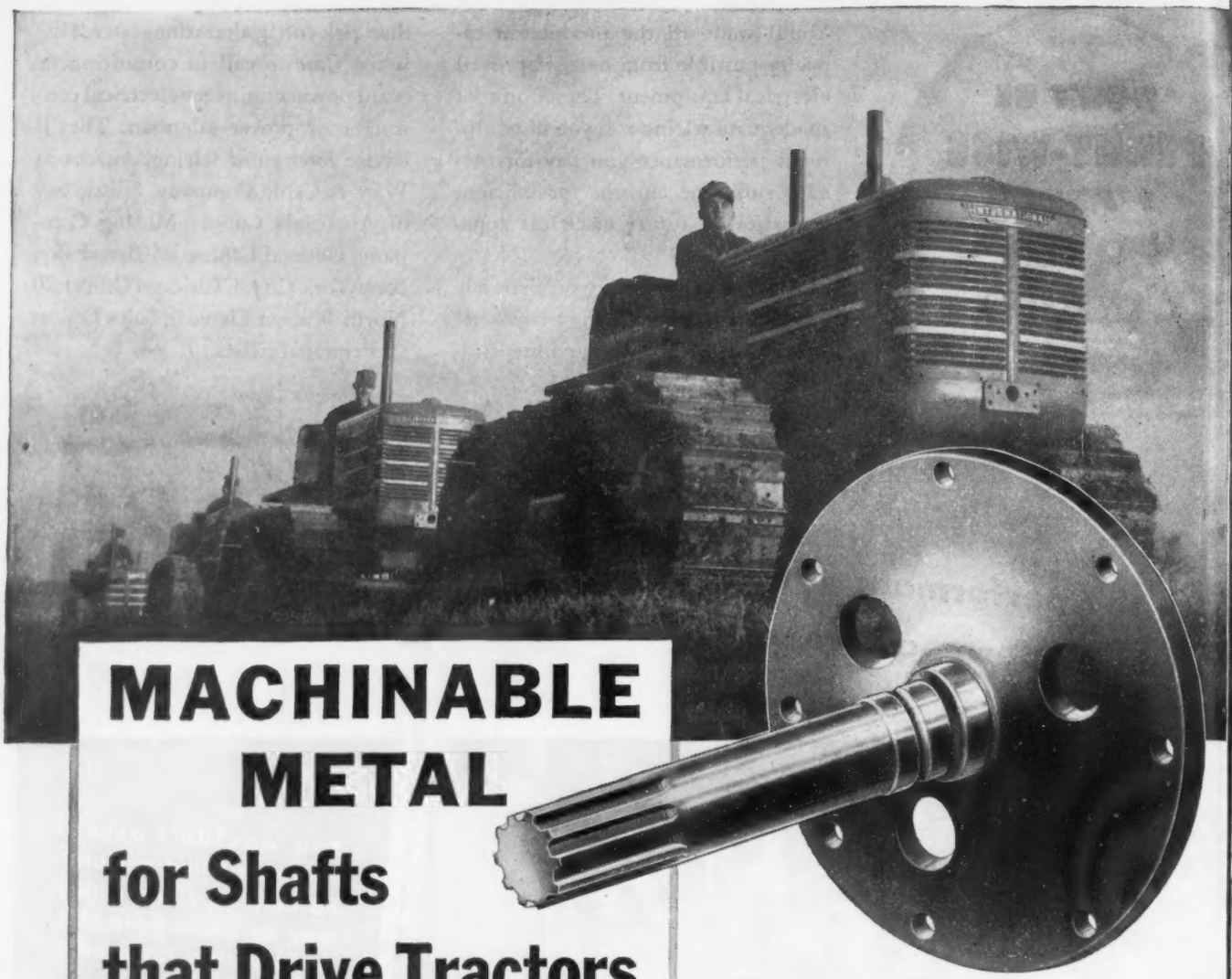


MACHINABLE METAL for Shafts that Drive Tractors

TAKE this sprocket drive pinion shaft. It transmits power from the transmission to the tracks of an International Crawler Tractor. It must be tough and durable to stand up under the strain of tractor operation and yet it must be machined to close tolerances. A tough production problem?

Not for Sulphite-Treated Steel.

Here is a metal that sacrifices nothing in strength and durability but is far more machinable than ordinary steel of equal strength. It is successfully used in all kinds of products, from crankshafts to shells. In every case machining operations are made easier, faster and at lower cost. Tool life is increased as much as 200%, saving both time and labor.

Your product may be one more application for this machinable steel. Let our sales and metallurgical staffs investigate the possibilities of solving your production problem with Sulphite-Treated Steel.

WISCONSIN STEEL COMPANY

180 North Michigan Avenue — Chicago 1, Illinois

WISCONSIN SULPHITE-TREATED STEEL

strip was the Kessler mill[5], shown in Fig. 8. The large roll 11 turns in roller bearings at its ends, but is not driven. The stationary platen 18 is rigidly supported by the housings at the ends, and has a hardened concave portion 19 facing roll 11. The strip is pulled through the mill by a tension reel or coiler (not shown). Pinch rollers 30 serve to guide the strip. Small rollers 20 are allowed to feed into the space between the platen and the strip, which is in contact with the lower roll. The enlarged section at the right in Fig. 8 shows the working section or region, consisting of a middle section 21 which is practically concentric with roll 11; a converging entrance zone 22, and a diverging discharge zone 23. The small rolls 20 are in close contact when fed into space 22, and each as it is drawn in by the motion of the strip is caused to bite into the latter and to roll the portion of the strip below it into a tapering step. As the rolls pass into the concentric portion 21, they smooth out the steps to produce a strip of uniform thickness. In zone 23 the pressure of the rolls is gradually relieved. Due to the elongation of the strip as it is reduced in thickness, the rolls spread apart while in the working space 21, but in region 23 the last roll exerting pressure on the strip and pulled forward by it, serves to push the preceding rolls ahead of it and to cause them to travel around the circuit between platen 18 and curved trackway or guides 24 (one guide at each end of the roll length), and thus the small rolls are returned to the entrance side.

How Small Rolls Are Adjusted

In order to bring the small rolls into parallelism with the platen, toothed wheels 25 are provided, one at each end of the rolls, with a rigid shaft connecting them. For adjusting the final thickness of the strip, wedges (not shown) are provided at each end of platen 18 for raising or lowering it with respect to the end housings, in which the bearings of roll 11 are fixed. Adjustment for wear of the hardened working surface 19 is made by changing filler piece 41; and by giving the latter a suitable contour, a curvature of the platen 19 in a plane through the roll axes can be produced, to give an effect equivalent to crowning the rolls.

Kessler of course realized that as the strip is reduced in thickness it must elongate, and therefore the parts subjected to pressure under each small roll must slip either forward or backward on the surface of lower roll 11. Since the driving is effected solely by front tension of the strip, no formation of loops or buckles of strip can occur in the spaces between the small rolls. Kessler, however, did show an alternative design in which the large roll 11 was eliminated and small rollers were used both above and below the strip, passing between two fixed platens; but did not show any means for insuring synchronization of each small roll above the strip with a corresponding one below the strip—an important requirement.

[5] U. S. Patent No. 2,069,496, to Harry A. Kessler, Feb. 2, 1937.

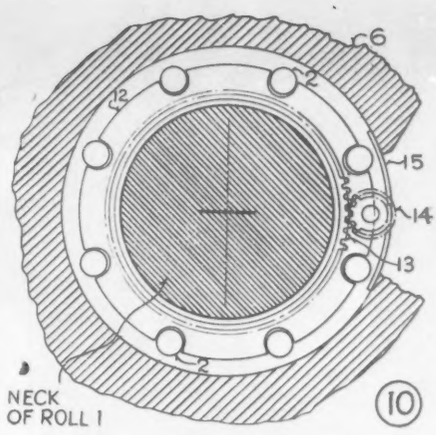


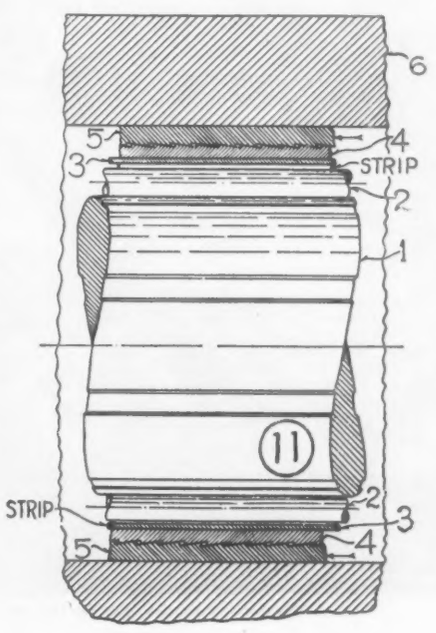
Fig. 10—Roll cages at end of Keller mill

It is understood that another well-known inventor has devised a form of rotating intermittent-action strip mill, and has constructed a unit in which nonferrous metals as well as steel strip have been processed satisfactorily. Because of the patent situation, however, he has asked that no description of the mill be published just at present.

The author has proposed a type of intermittent-action strip mill as shown in Figs. 9 to 11. In some ways it resembles the Evans mill, but instead of migratory rolls it has a number of small planetary rolls circling about the large central roll; and the strip is rolled between the planetary rollers 2 and the hard steel sleeve 3 which is held in the concave housing member or anvil 6. The large central roll 1 drives the planetary rolls by friction, and serves as the backup roll for them, but does not act on the strip.

As the planetary rollers progress (counterclockwise in Fig. 9), and the parts of the strip which the rolls have traveled over are reduced in thickness, they increase in length, and the strip forms loops or waves as shown by the solid lines *A*. Meanwhile, the incoming strip is being fed in at a constant rate by the pinch rollers, forming loop *A'*.

Fig. 11—Partial longitudinal section through Keller-type mill



Depressions or notches are provided in the surfaces of the large roll 1, equally spaced around the circumference and equal in number to the small rollers 2. As the latter circle around the axis of the large roll, they come to the notches 7, all of the small rollers reaching the notches at the same time. This releases the roll pressure on the strip, and leaves the latter free to be pulled around the rollers, under the tension in the outgoing strand of the strip. This tension pulls the strip tight, as shown by the dot-and-dash lines *B*, thereby taking up the slack at the entrance and advancing the strip by the difference in length between loop *A'* and straight piece *B'*, the length of this advance being determined by the rate at which the strip is fed in by the pinch rollers in relation to the speed of the rolls.

Sequence of Reduction

As the rollers 2 advance further, they come to the end of the depressions or notches 7 and are again forced into contact with the strip, squeezing it against the concave surface of liner 3 and rolling it out, somewhat like dough on a bread board under the action of the rolling-pin, until the next set of notches is reached, when the strip is again pulled forward and the sequence is again repeated.

At the place of contact of each roller with the strip, the latter as it is compressed and plastically deformed slips both forward and backward on the inner surface of liner 3, but chiefly forward. So far as the deformation and slippage in the working region are concerned, the rolling action is no different from that which occurs when rolling strip between a large roll and a small roll, as in a 3-high mill.

The notches or depressions of course could be placed in the inner surface of the liner or sleeve 3 instead of in the outer surface of the large roll 1, but inasmuch as it may be desired to subject the sleeve to a considerable bending stress for reasons explained below, the preferable location for the notches is in the large-roll surface. The ends of the notches where the rollers are again forced into contact with the strip are so shaped as to minimize the impact or suddenness of application of the force.

For correct operation of a mill of this type, two things are necessary: first, the axes of the planetary rollers 2 must be in exact alignment or parallelism with the axis of the large central roll 1, in order to prevent "crossing" when the small rolls enter contact again after

(*Please turn to Page* 173)

COPYRIGHT 1945, JONES & LAUGHLIN STEEL CORP.

FROM AN ORIGINAL DRAWING AND SKETCHES MADE AT J&L WIRE ROPE PLANT AT MUNCY, PENNSYL[illegible]RISON MACPHE

WIRE ROPE —A SINEW OF WAR AND INDUSTRY

What the muscles are to your body, giving you mobility and flexibility, wire rope is to countless machines that serve constantly, continuously, on home and battle fronts. Wire rope is a sinew of war and industry; it keeps the wheels moving; it gives life to virtually every phase of life itself.

Wire rope stems from steel, from wire drawn from steel, and is fabricated on machines made from steel, machines of the closest of tolerances manned by men of skill. And just as the muscles that serve you best are those you exercise, so much of the wire rope produced today is "exercised" before it is put into service by a method called pre-forming that makes it work easier, with less friction, and serve longer.

The war has opened many new fields of use for wire rope that promise an even wider application of its strength and versatility in the peace to come; affording new industrial sinews for the exercise of American ingenuity and enterprise.

Ralph Ardary,
a closing machine operator

Donald Gortner,
a stranding machine operator

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH, PENNSYLVANIA
CONTROLLED QUALITY STEEL FOR WAR AND PEACE

WAR & WIRE ROPE

Wire rope a machine of war. Intricately and scientifically woven of many individual wires (see illustration) wire rope produced in America is a machine made of steel for transmission of power that functions as an integral part of war-time operations.

Wire rope in tank treads, worked out by a J&L wire rope engineer in cooperation with one of the larger rubber companies, was developed with the rope embedded in the tough rubber to prevent "stretch" and "throwing," proved a great improvement.

Deadly PT Boats are controlled with the aid of preformed wire rope.

Wire rope controls bombers, fighters and other aircraft, and is used also in control mechanism of their guns and turrets. From 250 ft. to a mile of preformed wire rope go into each of the many thousands of U. S. combat and training planes.

Airplane cable is made by J&L at its Wire Rope Division, Muncy, Pa. as small as 1/16 of inch in diameter and composed of 7 strands of 7 wires each. The individual wires are only 7/1000 of an inch thick. This slender precisionbilt, preformed wire rope is capable of lifting 3 persons. At same plant J&L makes hundreds of other sizes and styles of wire rope from the smallest up to giant ropes capable of pulling more than a million pounds dead-weight.

Barrage balloons dangle preformed wire ropes to entangle enemy planes, and are operated with wire rope mooring lines.

U. S. Merchant Marine in this war is one of greatest consumers of wire rope. In a single voyage in convoy each Liberty and Victory Ship uses up almost a mile of wire rope. The entire fleet of 4,000 ships is estimated to consume approximately 10,000 miles of wire rope in a year (more than 50 million feet).

Wire rope on tanks, trucks, gun-carriers, half tracks is standard equipment for towing lines and winch lines to pull equipment from mud holes, negotiate steep banks.

The North Sea mine barrage and the Adriatic barrage were greatest consumers of wire rope in World War I. Former required 84,000,000 feet (16,000 miles) of wire rope and caught 17 German subs first week. The Adriatic barrage required 12,000,000 feet of wire rope, but the Armistice was signed before it was laid.

A canal across mountains led to redevelopment in America of lost art of making wire rope. Boats plying between Philadelphia and Pittsburgh, were hauled on rails by steam winches up the Allegheny mountains at Hollidaysburg, Pa. Chains and fiber cables soon wore out or broke under the strain of pulling half sections of heavy canal boats up the declivity. Canal's problem was solved by invention of wire rope made up of several wires twisted into strands. These strands in turn were twisted in rope heavy enough to do the job.

Evaluating SURFACE FINISHES

Accurate and rapid method of determining type and quality of surface finish of metals utilizes clear plastic film which "flows" over surfaces. Replica then is stripped and surface examined by passing it through narrow beam of light to register irregularities on photoelectric cell

DURING the past decade great advances have been made in the art of mechanically finishing surfaces, especially of metal objects. In a large measure this can be attributed to studies in which hitherto unknown correlations of mechanical and physical properties of metals with the character of their surface were revealed. Despite this progress and the development of means for closely controlling the type and degree of finish, the modes of specifying and designating their particulars have not been developed sufficiently to be universally acceptable to industry.

Any device for evaluating surface finish of metals to be universally acceptable to industry must perform accurately and rapidly, be reasonable in cost, and yield reproducible results. Because of the widespread interest and importance of this subject, the National Bureau of Standards has investigated the application of nearly transparent surface replicas for evaluation of metal surface finish. This study has resulted in the development of a method for evaluating the finish of a surface through the medium of a properly prepared replica of the surface, and is described in detail by Harry K. Herschman in the article "Evaluation of Finish of a Metal", which appeared in the *Journal of Research* of the National Bureau of Standards for January, 1945[1]. It is believed that this method offers considerable promise in connection with specifications and standards for surface finish of metals and should be of interest to engineers and designers dealing with such problems.

The plastic replica of a surface may be produced by different means. In the Herschman experiment, replica was prepared by applying a suitable solvent to the metal surface, after which a clear plastic film was pressed on. The solvent softened the side of the film adjacent to the metal surface being examined and permitted it to flow and conform under pressure to the minute surface irregularities. Such films dry in about 1 min and can be readily stripped from the metal surface. McDill[2] has been active in developing method for producing replicas of surfaces.

In this work Herschman used a solvent composed of 80 per cent toluene and 20 per cent acetone. The plastic was a preformed film of ethyl cellulose, 0.005-in. thick by 1.5 in. wide. In some experiments, dyes (oil soluble type) were added to the solution to develop greater detail of the surface serrations. The film was pressed on with a special roller of pliable rubber. Characteristic details of replicas of metal surfaces produced in this

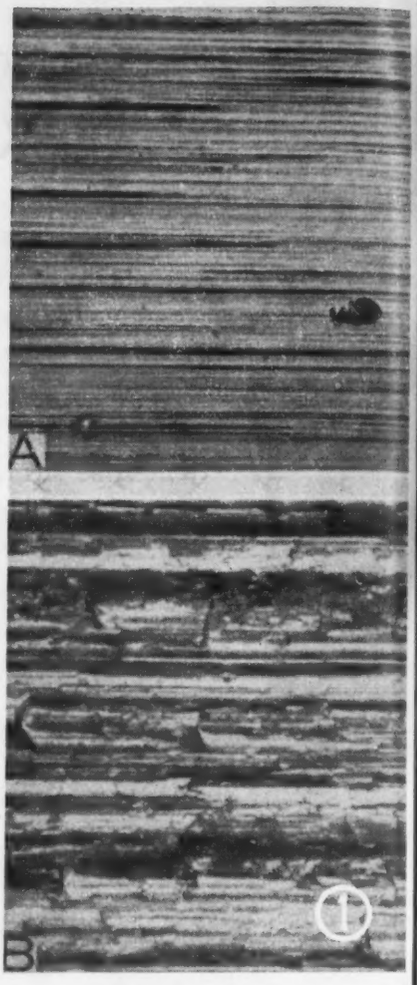


Fig. 1—Photomicrographs obtained from plastic replicas. A, finely ground surface; B, coarse-shaped surface. Photographs with transmitted light. Magnification X100. All illustrations are taken from the Research Journal of the National Bureau of Standards

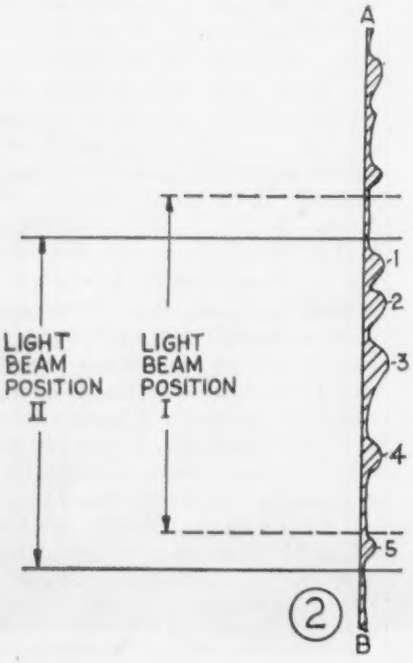
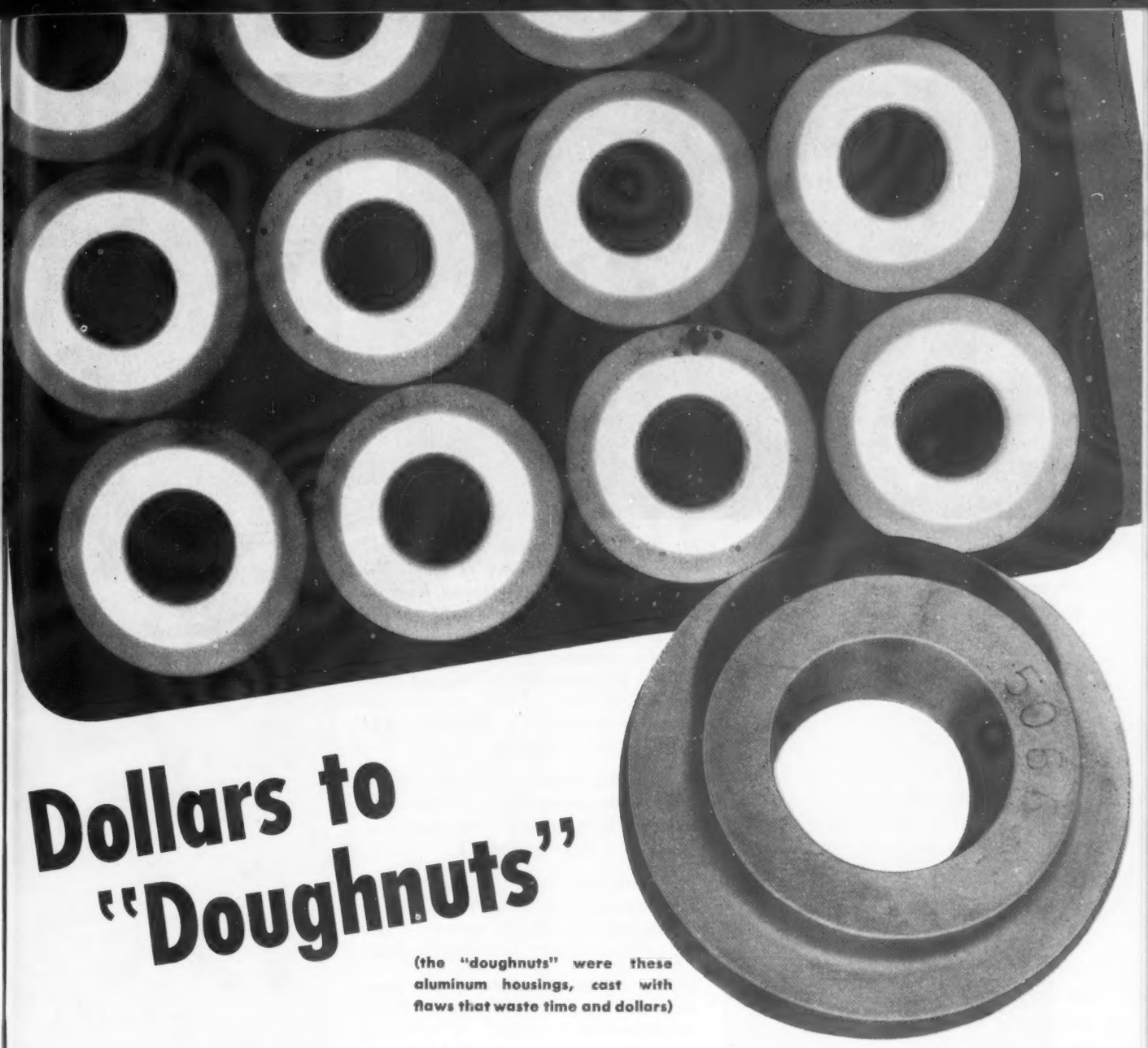


Fig. 2—Example of manner in which changes occur in intensity of light transmitted through moving replica. A-B is section of replica showing profile contour. Number and nature of irregularities included within separate limits of two light beam positions differ. Transmitted light reaching slit of photoelectric cell therefore will differ in these cases

TABLE I

Specimen	Type of Finish	Average "Peak to Valley" Profile Depth (Microscopic Section)* in. X10^{-6}	Average Profile Evaluation (RMS) in. X10^{-6}	Replica Surface Analyzer Evaluation Diaphragm B† mvX10^{-1}
0	Polished	11	1.5	8
1	Lapped	28	4	16
2	Fine-ground	46	7 to 11	25
3	Fine-shapered	320	65 to 70	54
4	Coarse-shapered	720	150 to 170	92

* Each value is the average of 50 to 60 determinations made on 3 sections of each specimen.
† Diaphragm B consisted of an alinement of 10 holes, each about 0.05-in. in diameter, with centers spaced approximately 0.12-in. apart.



Dollars to "Doughnuts"

(the "doughnuts" were these aluminum housings, cast with flaws that waste time and dollars)

RADIOGRAPHY reduced rejection from 18% to less than 1%

HERE again is an "inside story" of X-ray at work . . . of its ability to control the quality of parts . . . and improve manufacturing technic . . .

Simple aluminum housings—ordered from a foundry—were radiographically inspected on receipt . . . with immediate rejection of 180 in every 1000.

Disastrous? No, for the fact that these flaws were discovered *before* machining meant valuable savings in time (of workers and machines), money, materials. And the best was yet to come . . .

The radiographs—showing irregularities—were referred back to the foundry. Careful study suggested a new technic. Rejections on further deliveries dropped from 18% to less than 1%.

Teamwork—that's the keynote of this case history . . . with customer, foundry, and X-ray working together toward greater efficiency, increased production. Time and again—in widely divergent industries—Radiography proves its worth . . . analyzing . . . inspecting . . . correcting . . . improving . . . eliminating waste . . . lowering costs . . .

Radiography as an industrial tool has proved its ability to help industry meet present-day requirements. It can be depended upon to do as much in the future. Eastman Kodak Company, X-ray Division, Rochester 4, N. Y.

RADIOGRAPHY

Analyzes . . . Instructs . . . Corrects . . . Improves

Kodak

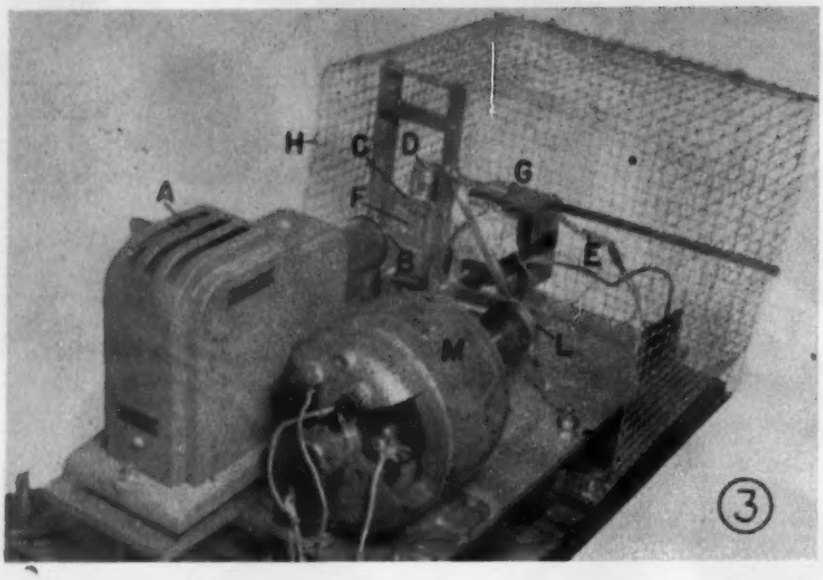


Fig. 3—"Replica" surface analyzer developed at National Bureau of Standards. A, light source; B, condensing lens; C, frame for holding replica of surface finish; D, photoelectric (cesium) cell; E, 5 megohm resistance; F, replica; G, 90-v B battery; H, screen for shielding out stray currents; L, cam and lever for actuating frame C; M, motor for driving cam and lever L

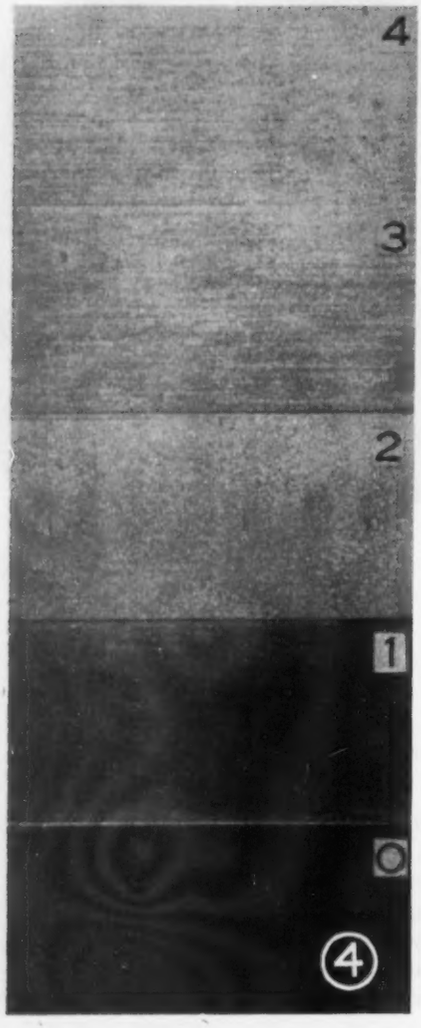


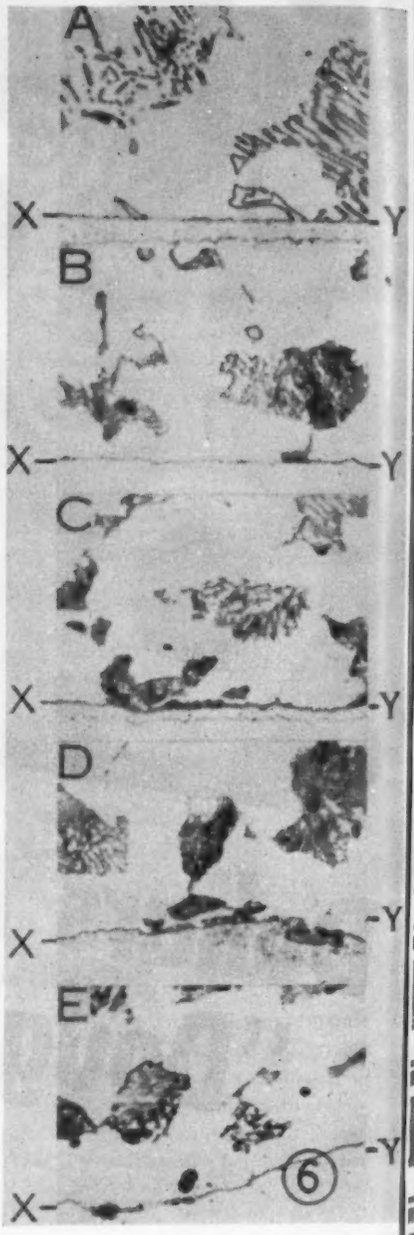
Fig. 4—Characteristic appearance of surfaces of test specimens, photographed by reflected light directly from specimens. Magnification X1

Fig. 5—Electric circuit of the "replica" surface analyzer. Rotating drum K may be substituted for vertically actuated frame C to accommodate extra-long replicas

Fig. 6—Photomicrographs of test specimen sections showing contour of profile (indicated by trace XY) on surface of each. Edges were preserved by electroplating with about 0.0002-in. of copper and about 0.002-in. of nickel. Etching done by 4 per cent picric acid solution in alcohol. Magnification X1500. A, polished surface; B, lapped surface; C, fine-ground surface; D, fine-shapered surface; E, coarse-shapered surface

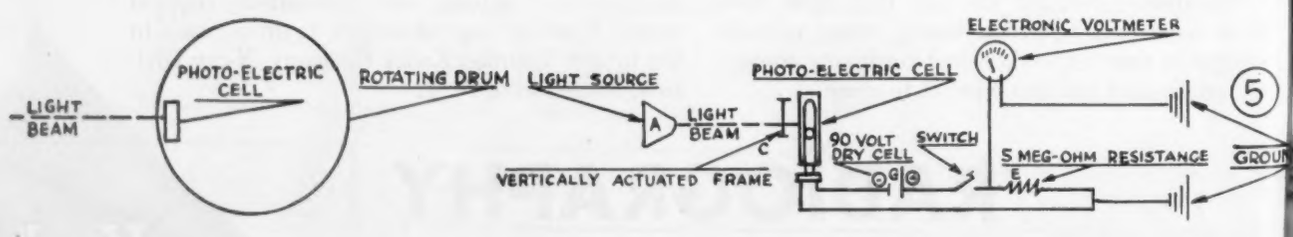
manner at National Bureau of Standards are illustrated in Fig. 1.

Examination of these replicas showed that the degree of transparency decreased with increased roughness of the original surface. Another significant fact also noted by Herschman in his work was that the rougher the metal surface, the more



pronounced the variations in the geometry of the reproduced patterns became. This fact led to the development of an apparatus for evaluating surface roughness based on the degree of variation of the geometric characteristics in a nearly transparent replica. This method consisted essentially in passing a narrow beam of light transversely through the moving replica on to a photoelectric cell. Variations in the geometric character of the film, which are associated with the serrations of the reproduced metal surface, control the intensity of the light passing through the film, thereby reaching the

(*Please turn to Page* 176)



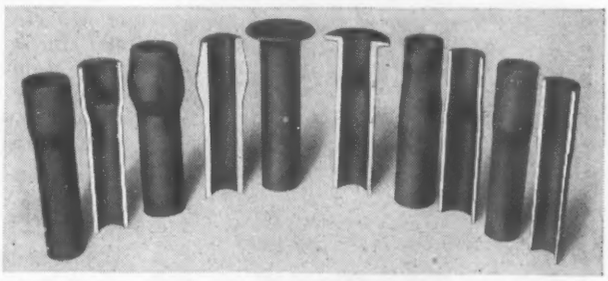
All Kinds of Steel Tubing for All Kinds of Jobs

B&W Mechanical Tubing is available in all carbon steels, NE alloys, SAE alloys, stainless and corrosion resistant steels.

Finding the right kind of tubing—Seamless or Welded—for each mechanical requirement is greatly simplified when the problem is put up to Babcock & Wilcox. Matching tubes to jobs—finding the steel analysis best suited for each purpose—is a specialty with B&W.

To this end, metallurgists and technicians are continuously searching for better alloys—testing for proper hardness and hardenability—checking yield strengths, elongation, and tensile strengths against service demands. At B&W your problems are considered in the light of experience with an unusually large variety of analyses, many of them available from no other source; first hand knowledge of the fabricating, machining, heat-treating, and other capabilities of steels from simple low carbons to high alloys. Making a complete range of both Seamless and Welded Tubing, B&W is in a position to match tubes to jobs without prejudice toward any type of materials. B&W recommendations are therefore impartial and unbiased.

Next time you have a job for tubing, chances are that B&W's experience in making and applying tubing for 35 years, its modern specialty tube mills, extensive laboratory facilities and vast fund of technical data, can save you time and trouble in finding the best tubing for the purpose.



Typical examples of special forms of B&W Mechanical Tubing

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SEAMLESS. Complete range of carbon, alloy and Stainless steels. Sizes ½ in. to 8⅝ in. O.D.
ELECTRIC-RESISTANCE WELDED Carbon steel grades. Sizes: ¾ in. to 4 in. O.D.

THE BABCOCK & WILCOX TUBE CO.

Welded Tube Division, Alliance, Ohio — Seamless Tube Division, Beaver Falls, Pa.

TA-1320

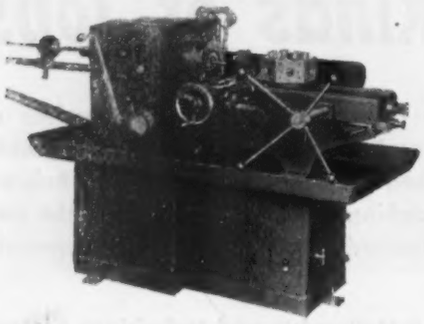
B&W MAKES BOTH

6249

INDUSTRIAL EQUIPMENT

Hand Screw Lathe

Known as No. 601 Rapiduction, an improved hand screw lathe has been developed by Oster Mfg. Co., 2015 East Sixty-first street, Cleveland 3. The new



4-speed motor permits four speed changes without change of sheaves. It is also available with a 2-speed motor.

Motor is mounted on oil resistant rubber to insure smooth, quiet operation. Coolant pump has its own ⅛-hp motor to provide uniform lubrication independent of spindle speeds. New electrical controls have speed selector switch located conveniently for the operator. Automatically indexed, six position turret is optional with plain saddle.

Capacity of this unit is 1½ in. round bar. Swing over bed is 14 in.; over cross slide, 6½ in.

Recording Galvanometer

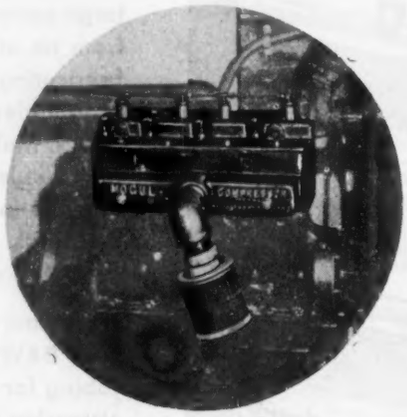
The new recording galvanometer announced by Brush Development Co., 3405 Perkins avenue, Cleveland 14, embodies a low mass, 3-in. long tapered tube recording pen, actuated by a per-

manent magnet penmotor utilizing newly developed material and techniques. Pyrex tipped pen records directly in ink on a moving paper chart, pressures, vibrations, strains, currents and voltages of frequencies from dc to 120 cycles per second. It has no overshoot up to 70 cycles per second at a maximum swing amplitude of 20 mm each side of center line. Frequency response flat to 70 cycles per second, accurate to 120 cycles per second. Pen can be centered on or raised from chart.

Impedance of penmotor is 1500 ohms. Minimum sensitivity is 1.1 mm per volt, 1.6 mm per milliampere, 21 v full scale. Overall dimensions are 5 in. high by 4 in. wide by 1⅝ in. thick; facilitates minimum spacing of multiple units on 1¾ in. centers. Four No. 10-24 tapped holes are located in rear face for mounting. A large ink well minimizes frequency of refilling. The device is available as shown or with three speed paper drive (2 in. wide chart); one or two channels and single speed paper drive (12 in. wide chart, four to six channels).

Compressor Head

Metallizing Co. of America, 1330 Congress street, Chicago 7, announces a new compressor head which will put scrap blocks to work. Made of noncritical materials, the head is designed for



use on a model A or B Ford motor block.

It is designed to deliver a volume of 139 cfm with an actual delivery of 100 cfm at 100 lb pressure. The complete unit includes valve and water chambers, air intake manifold, air strainer, unloader, pilot valve and necessary parts for assembly.

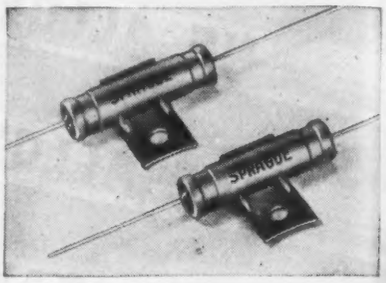
Flexible Shaft Angle Drills

A complete line of flexible shaft angle drills is offered by Zephyr Mfg. Co., Inglewood, Calif. Line includes both 18 and 30 in. flexible shafts coupled to 45°, 90° or 360° angle drills. The flexible shafts alone can also be supplied for coupling to other angle drills or with threaded spindle for direct use without an angle drill.

Flexible shaft has piano wire stress-relieved core encased in oil resistant rubber and fitted with oilless type bronze bearings. Drill heads are precision made to close standards with heavy duty bevel gears and nonfriction ball and needle bearings.

Non-Resonant Capacitors

Capacitors that do not show resonance at frequencies as high as 50 megacycles and in some instances up to 300 megacycles are offered by Sprague Electric Co., North Adams, Mass. The units are of advantage in filtering or bypassing

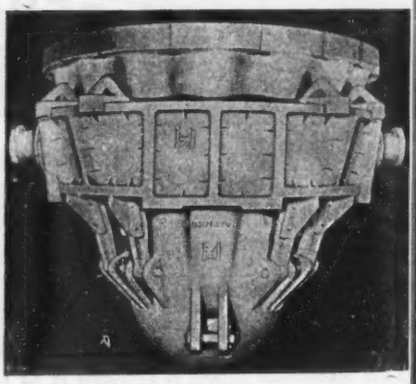


over wide frequency bands. These capacitors are installed by connecting them in the circuit in the same manner as a low pass filter would be connected. Their two terminals are connected in series with the circuit and the container is grounded.

Cinder Pot

A new corrugated cinder pot with an expansible rim, introduced by Mackintosh-Hemphill Co., Pittsburgh, serves to maintain top of pot in a true circle and prevent distortion. The tell-tale expansion joints in rim indicate where pot may be handled without danger by trunnion, bail ring or lifting lugs.

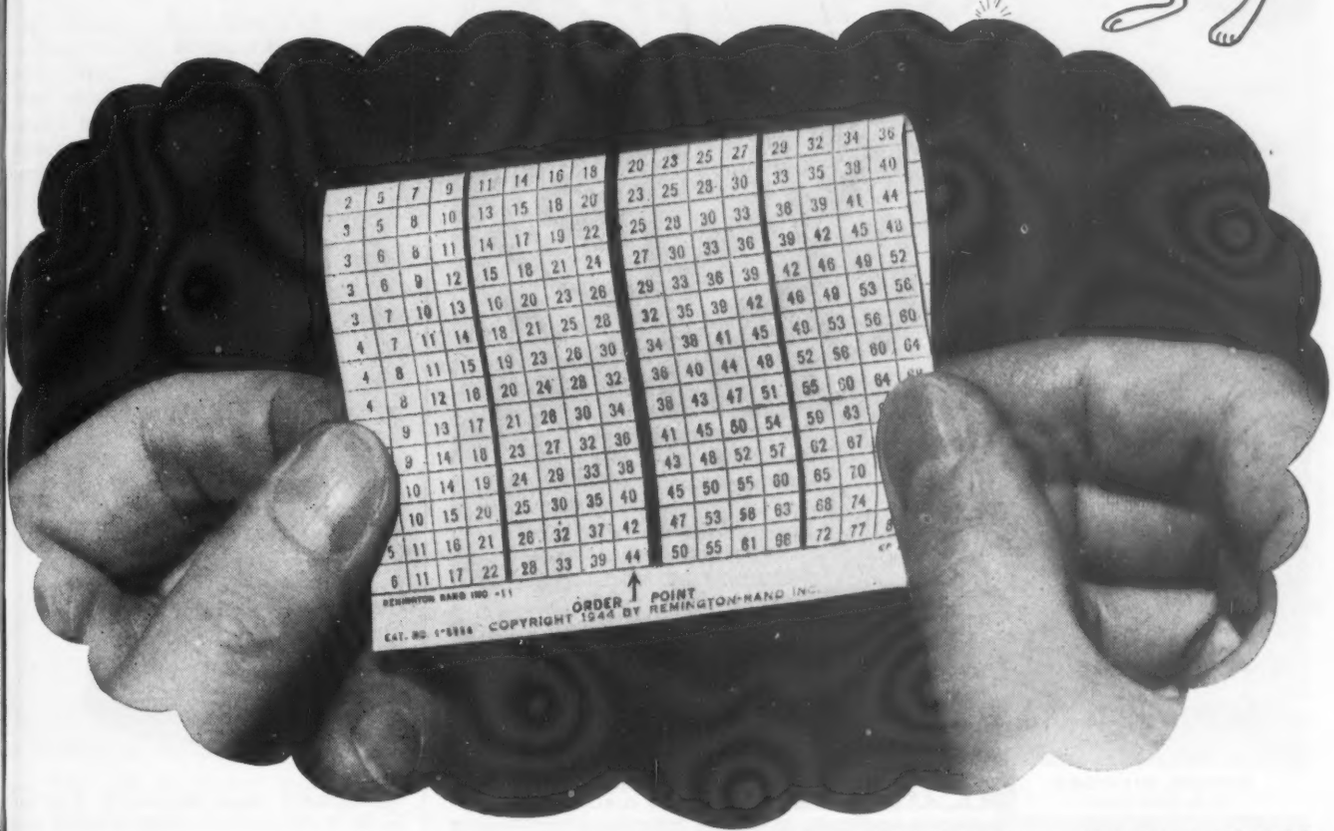
Pot is used primarily in open hearth



operations, but is adaptable to all iron, steel and nonferrous smelting plants. Complete with supports, it weighs 44,000 lb and lifting ring weighs 15,000 lb. It is 10 ft 9 in. high, 11 ft in diameter at top, with a capacity of 400 ft. Improved type supports place the major portion of pot wall in compression, support pot from its coolest point and can be used on successive pot replacements. Thermal stresses set up in pot wall during dump-

(All claims are those of the manufacturer of the equipment being described.)

Introducing the new "MAGIC" that's needed in stock control!



Simplification of stock control is imperative today.

The transition from operation under war conditions to the competitive realities of peacetime will require that supplies be maintained in balance at levels consistent with usage. Operating costs, too, must be pared to the bone.

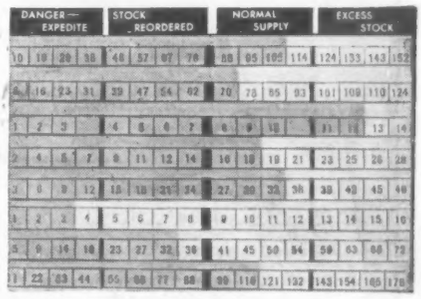
The old barriers to these objectives have been cleared away! "Systems" Technicians have perfected a *new kind* of Kardex visible control that brings unheard of simplicity... speed... accuracy to the management of stocks.

The "magic element" is an Automatic Computing Insert. Used with our exclusive Graph-A-Matic signal control, this eliminates all need of computation in *visibly charting* new balances and interpreting them. *Actual numerical balances* are shown graphically on Kardex Visible Margins with the reorder point of all items, regardless of usage, in uniform reference position. *Without analysis,* Graph-A-Matic flashes when each item should be reordered, when follow-up should be instigated and when overstocks threaten.

This system has already produced extraordinary results for many prominent companies. It provides simple, complete and positive *control*—the means of combining high turnover with ability to maintain satisfactory delivery schedules. It saves clerical costs and more important, the many executive hours ordinarily required for "analysis".

FOR FULL DETAILS ask our nearest Branch Office for MC No. 708. This system can be applied to many types of existing records.

KARDEX GRAPH-A-MATIC
Analyzes Stock Conditions for VISUAL Control!



Signals over numeric balance indicate exact stock status. If the rate of usage changes, *"Reorder Scale"* is adjusted by merely refolding the paper insert.

SYSTEMS DIVISION
REMINGTON RAND
Buffalo 5, New York

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We're Saving DIAMONDS Here!

Diamond consuming rough grinding is eliminated by precise adjustment of insert in TUNGTIP carbide milling cutters. Only finish grinding is necessary. TUNGTIP blades are accurately positioned by screw mechanism.

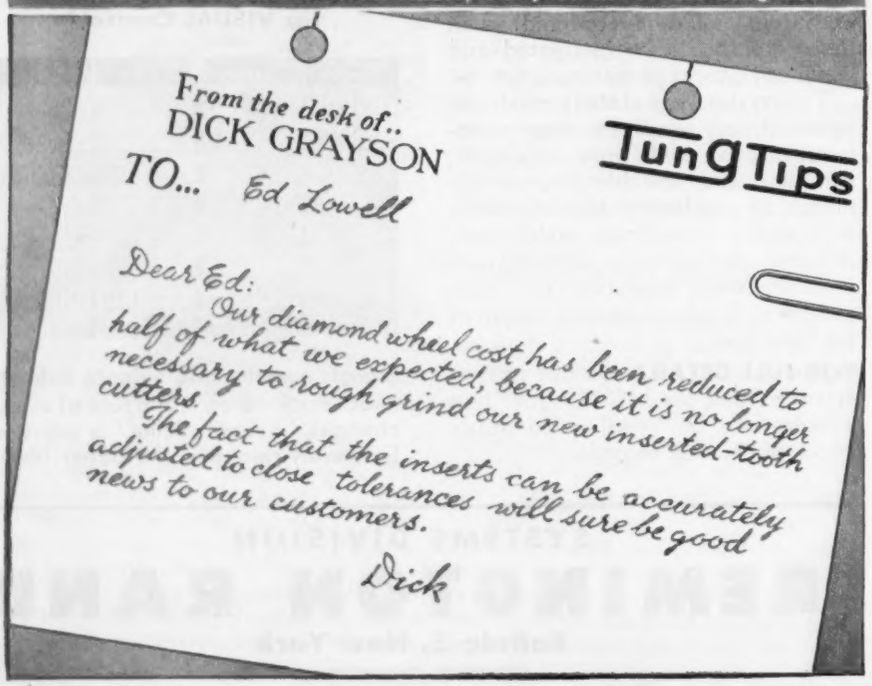
Save Diamond Wheels...Save Grinding Time...
Save Adjustment Time...Save Tungsten Carbide

DETROIT, MICHIGAN
P.O. BOX 1027

TungTip
TOOLS DIVISION

MONROVIA, CALIFORNIA
P.O. BOX 88

LOWELL & GRAYSON... formerly Grayson Manufacturing Co.

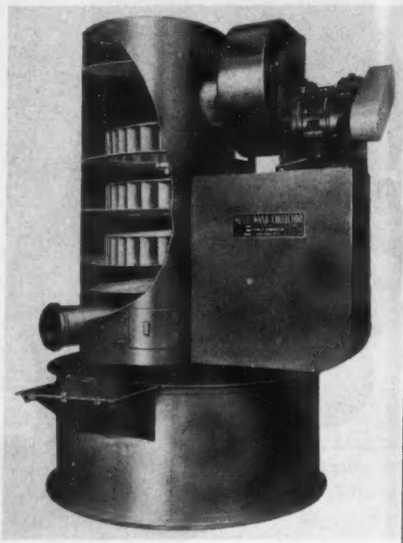

From the desk of..
DICK GRAYSON
TO... Ed Lowell
TungTips
Dear Ed:
Our diamond wheel cost has been reduced to half of what we expected, because it is no longer necessary to rough grind our new inserted-tooth cutters.
The fact that the inserts can be accurately adjusted to close tolerances will sure be good news to our customers.
Dick

ing period are almost as severe as during filling period when molten slag raises temperature of inside surface of pot wall from less than 100° F to over 2000° F in a few minutes.

Pot is corrugated to provide unrestricted expansion and contraction and quicker cooling of slag. They may be provided with a copper coating in bottom section to provide easier dumping and skulling.

Dust Collector

Type EC multi-wash collector, announced by Claude B. Schneible Co., 2827 Twenty-fifth street, Detroit 16, combines in a compact, portable, self-contained unit all the functions of a large central dust and fume control system. Equipment consists of a three and a half

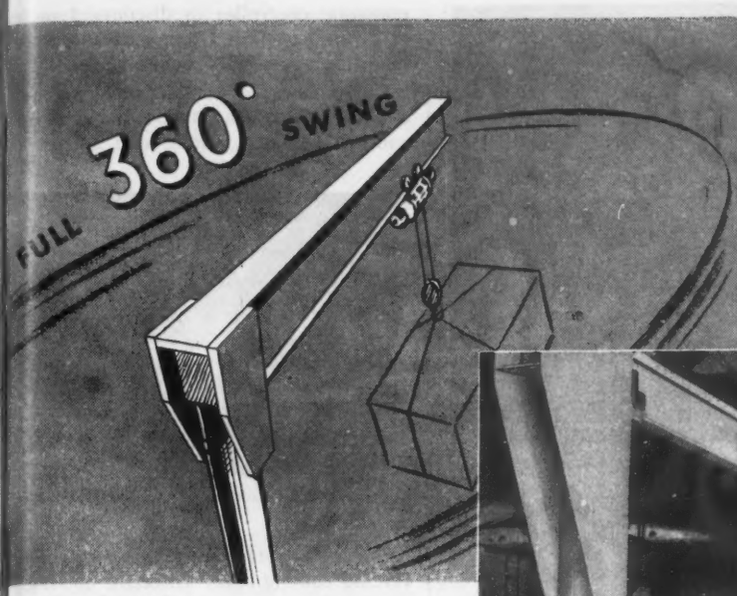


impingement stage multi-wash dust collector, a suction fan, sludge settling tank, recirculating pump, and an after filter. These units are availiable in air capacities from 400 to 500 cfm.

On this collector there are no bags, screens or filters to replace or clean and there are no parts to wear, clog, burn or become inoperative. Collected matter, as sludge, is disposed of more easily than an accumulation of dust.

Explosion Proof Motor

A new Class I, Group C, explosion proof motor for atmospheres containing ethyl-ether and similar vapors, is announced by Motor Division of General Electric Co., Schenectady, N. Y. Recommended for use in chemical plants, hospitals and research laboratories, the unit is available in frame sizes 204-326 and in types K (normal torque) and KC (high-starting torque). The motor is rated ¼-hp at 600 rpm, to 20 hp at 3600 rpm, 110, 208, 220/440, 550 v, 60, 50, 25 cycles. Construction is the same as Class I, Group D motors, but a special flamepath is used at the shaft openings to cool flame of internal explosions. Thermostats operate in conjunction with



CHICAGO TRAMRAIL

JIB CRANES

SPEED

POINT-OF-OPERATION JOBS

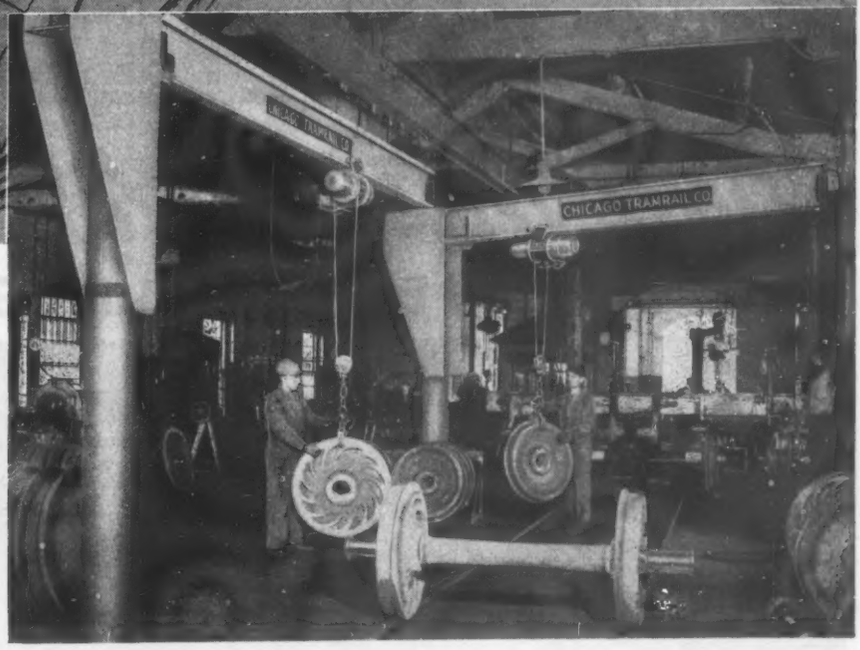


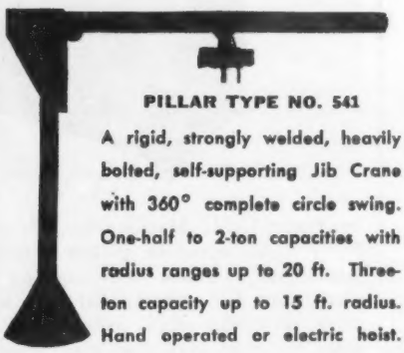
PHOTO COURTESY UNION PACIFIC RAILROAD

YOU SAVE...

1. MANPOWER
2. INSTALLATION COSTS
3. COMPENSATION COSTS
4. PRODUCTION COSTS
5. MAN-HOURS

The assembly of railroad wheel-and-axle units is a job that calls for precise coordination in heavy handling. Too light a job for costly overhead cranes, and too dangerous for all but the most skilled manual labor, it is an ideal application for fast-action, flexible Jib Cranes. Working in conjunction, the two nimble Jib Cranes ease the wheels into place on the axle swiftly and surely, without danger to the delicate bearing surfaces of the axle or journal. This used to be a job for skilled workmen, but now easy-to-operate Jib Cranes take over the difficult task—a real help in these labor-scarce times.

Jib Cranes help to reduce compensation costs because they lessen the probability of accidents that are so frequent in heavy handling. For example; the operation above was formerly a dangerous one. Many strains and broken bones resulted from rolling the heavy wheels into position, but now the men have only to guide the free-swinging Jib Cranes as they swing around, pick up the wheel and carry it to the point of assembly.



PILLAR TYPE NO. 541

A rigid, strongly welded, heavily bolted, self-supporting Jib Crane with 360° complete circle swing. One-half to 2-ton capacities with radius ranges up to 20 ft. Three-ton capacity up to 15 ft. radius. Hand operated or electric hoist.

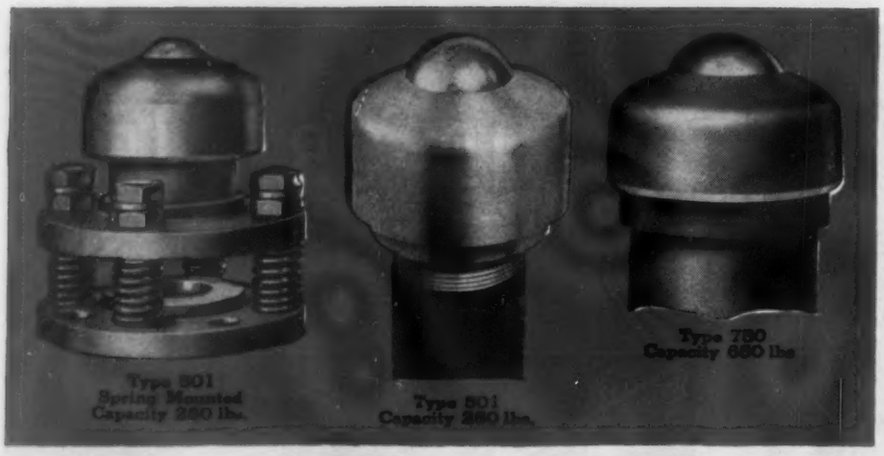
IN *YOUR* PLANT . . . .

It's easy to see how swiftly, economically and safely Jib Cranes perform the operation illustrated. You can effect these same savings in your plant through the use of Jib Cranes. Look around your plant—you're sure to see many places where the use of these sturdy "mechanical muscles" will save you time and money as well as speed up production. Write for full particulars today. We will be glad to send you an illustrated circular showing the various types of Chicago Tramrail Jib Cranes together with many suggested applications for their use.

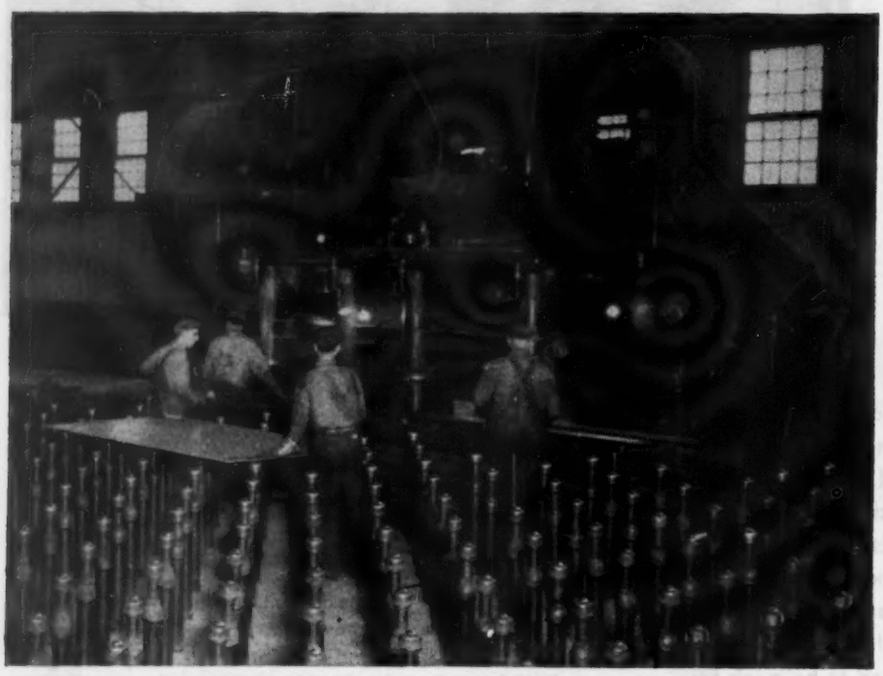
WRITE TODAY!

CHICAGO TRAMRAIL COMPANY

2912 CARROLL AVE. PHONE KED 7475 CHICAGO 12, ILL.



Ball Transfers
SPEED PLATE HANDLING

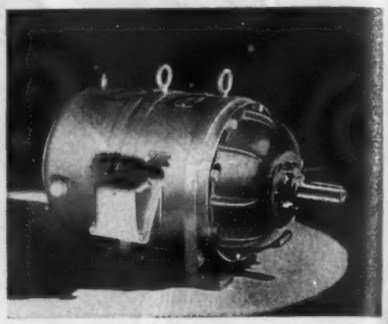


For handling plates into shears, punches or presses, for transferring slabs, sheet packs and similar loads, ball transfers are extremely efficient. The plates move into position with a minimum of effort, and can be moved sharply in any direction without any preparatory circular motion, such as is necessary when inverted casters are used. The cap on the transfer keeps dirt out and tends to keep the main ball clean. Tapered holes in the bases provide exit for dirt which might get into the unit. The contour of the cap affords no projecting bolts or edges to be knocked off or battered by drooping plates. The caps are removable so that the units can be cleaned thoroughly from time to time. The range of heavy duty sizes shown above is adequate to meet most requirements.

Mathews Conveyer Company
ELLWOOD CITY, PENNSYLVANIA
MANUFACTURER'S ASSOCIATION, INC. EQUIPMENT

magnetic controller to disconnect motor at a pre-determined temperature, but do not supplant regular overload relays.

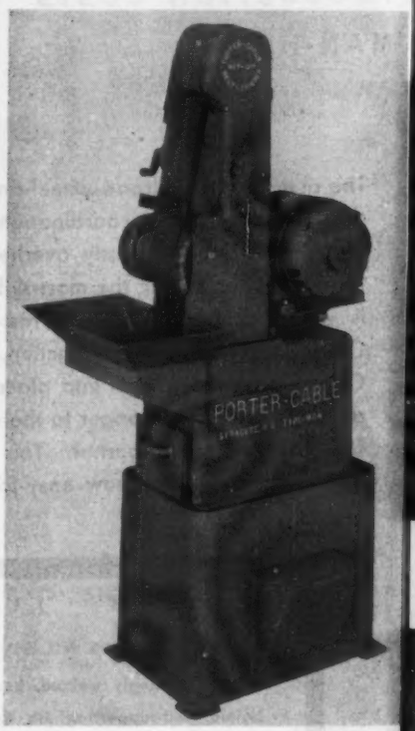
Other features of this motor include a cast iron stator, a four position cast iron conduit box and strong end shields of



corrosion resistant cast iron with reinforcing cooling ribs. Effective cooling is provided by a nonsparking fan and a pressure relief system provides for lubrication without disassembly of motor.

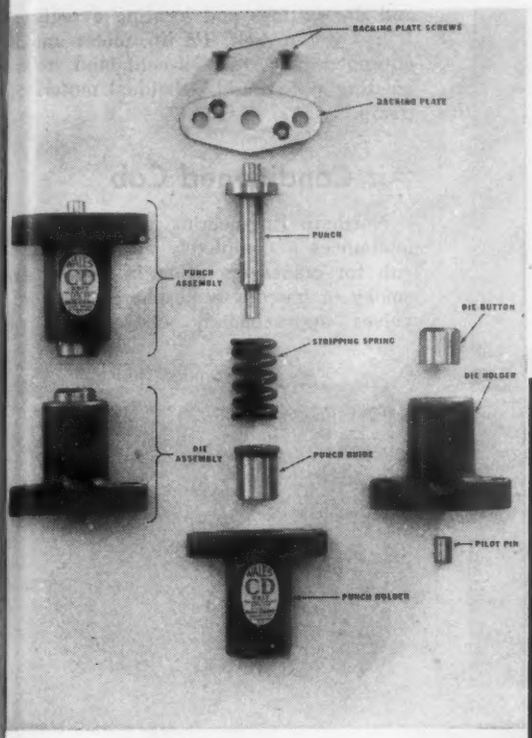
Wet Belt Surfacer

Advantages of wet belt machining may be applied to line contact grinding and polishing as well as platen machining in a new machine developed



by Porter-Cable Machine Co., Syracuse N. Y. An accurate platen is located immediately above the contact roll convenient for grinding flat and square after removing stock over the contact roll. In this unit the cool operation speeds the cutting, prevents loading of the belt and eliminates burring operations.

Model WG-4 appeals to those responsible for production, cleaning up sand



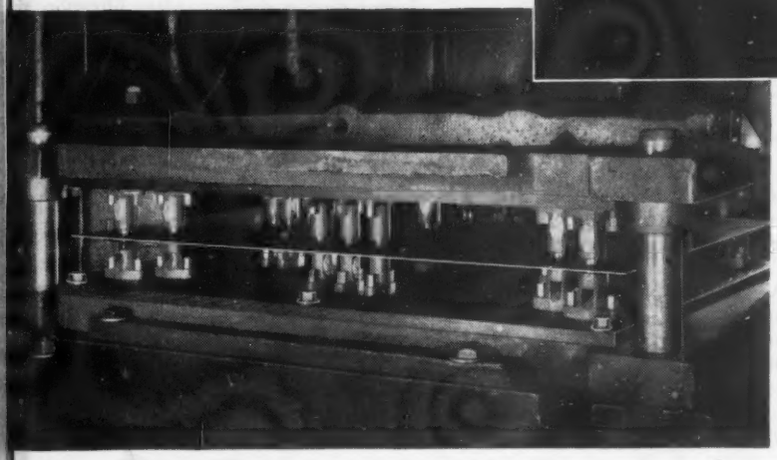
Showing all parts of Wales Type "CD" Units assembled and disassembled. These parts are easily assembled and disassembled for quick changes.

SIMPLIFY... STANDARDIZE... SAVE WITH...

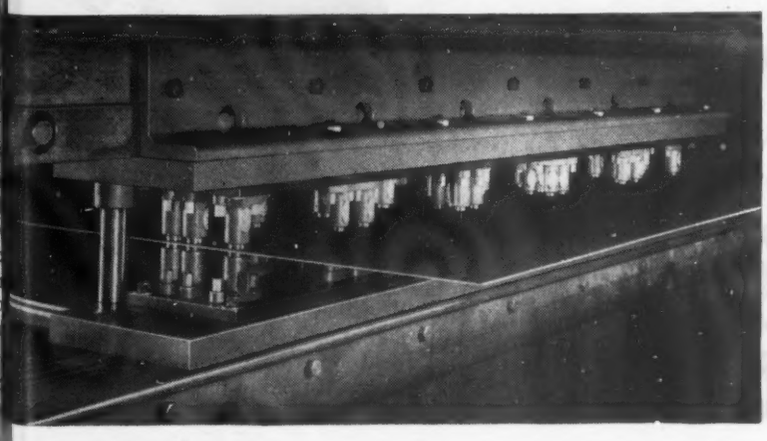
WALES

TYPE "CD" HOLE PUNCHING UNITS

Light weight and easy handling of template set-ups is demonstrated by a man carrying punch and die set-ups that will punch 21 holes when mounted in die set.



Illustrating the work being punched with stamping press ram in down position.



Showing the work in a press brake-set-up. Note unobstructed feeding of the work.

● The customary expensive and time-consuming methods usually associated with building a single purpose die to punch a multiplicity of holes *is eliminated* with Wales Type "CD" Hole Punching Units.

SAVE making special punches and punch plates, special stripper plates and special die buttons and die plates.

SIMPLIFY die design and die making.

STANDARDIZED Wales punches, dies, and stripping mechanisms permit units and parts to be carried in stock for setting up and servicing.

Write TODAY for functionally colored, 32-page catalog with 48 illustrations showing these Units being set up and operating in stamping presses and press brakes.

ARMY E NAVY

WALES-STRIPPIT CORP.

385 PAYNE AVENUE
NORTH TONAWANDA, NEW YORK
(Between Buffalo and Niagara Falls)
GEORGE F. WALES, President

Specialists in Punching and Notching Equipment

NIAGARA
Evaporative COOLING
Does It Better

Cooling Fluids with Closer Control of Temperature

Niagara Aero Heat Exchanger cools liquids or gases to within 10° of atmospheric wet bulb temperature and holds them to a tolerance of 2°F. with the NIAGARA "Balanced Wet Bulb" control.

Holding Temperatures of Quenching Baths

Hundreds of heat treaters now use Niagara Aero Heat Exchanger to cool and control quenching baths, improving quality, increasing production, avoiding troubles, and saving cooling water expense.

"BALANCED WET BULB"
TEMPERATURE CONTROL

U. S. Patent Re-issue No. 22,533
U. S. Patents 2,166,397; 2,296,946;
Re-issue No. 22,553
Other Patents Pending.

Compressed Air After-Cooling

Niagara Aero After Cooler cools compressed air colder to eliminate one-half the moisture permitted by conventional methods and controls jacket water temperature. Saves cooling water cost.

Condensing Refrigerant Gases

Niagara Duo Pass Aero Condenser saves power, increases compressor capacity, saves condensing water cost, increases plant production. Duo Pass prevents scale formation; assures full capacity always.

OTHER USES OF NIAGARA AERO HEAT EXCHANGERS include chemical and industrial process liquid cooling, engine jacket water cooling, hydraulic fluid cooling, transformer oil cooling, lubricating and cutting oil cooling, water jacketted bearing and furnace cooling, vapor and steam condensing.

Consult your Niagara Engineer for information on any application of air engineering equipment, including air conditioning for industrial processes, NIAGARA "No-Frost" refrigerating systems for storage or process, heating, cooling, drying or humidification.

NIAGARA BLOWER COMPANY

Over 30 Years of Service in Industrial Air Engineering

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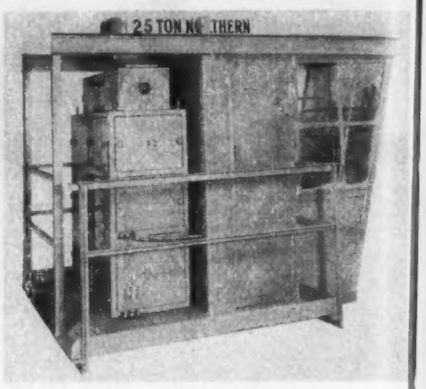
Field Engineering Offices in Principal Cities

INDUSTRIAL COOLING HEATING • DRYING
NIAGARA
HUMIDIFYING • AIR ENGINEERING EQUIPMENT

and die castings and locating a register. It has a 4 in. belt, 1½ hp. motor and is equipped with a self-contained recirculating system and individual motorized pump.

Air Conditioned Cab

Northern Engineering Works, Detroit, announces a completely air conditioned cab for cranes operating in hot, dusty, smoky or gaseous atmosphere. Cab receives approximately one change of



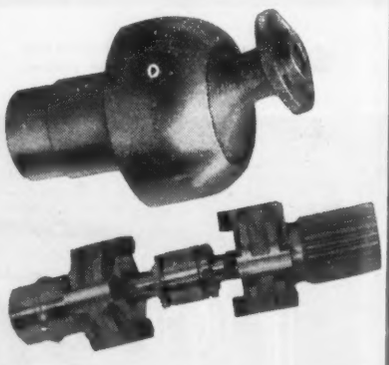
fresh, cool, clean air every minute. Regardless of the atmosphere in which the crane operates, craneman is comfortable and has fresh air to breathe.

Unit uses a triple filter—Precipitron which takes out the smoke; activated carbon which removes fumes and gases and mechanical filters which remove larger dust particles. After filtration air is drawn over a refrigerating coil which reduces temperature to efficient working range.

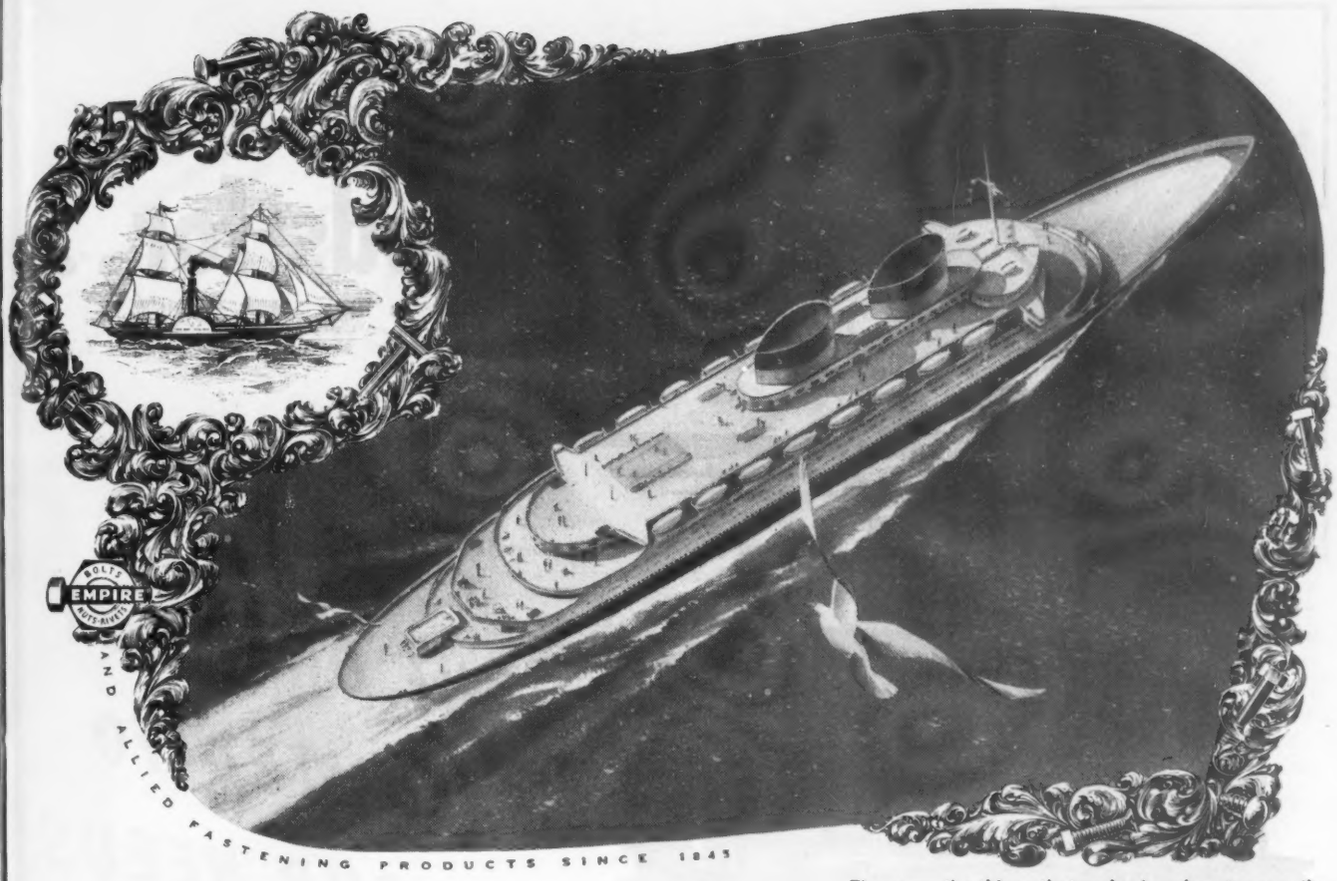
Where operation requires an open window, similar effect can be obtained by using larger equipment. In either case, cab is kept under slight air pressure so outside atmosphere cannot leak in.

Universal Joints

Gear Grinding Machine Co., 3901 Christopher, Detroit 11, announces two constant velocity universal joints. These joints operate at speeds up to 9000 rpm



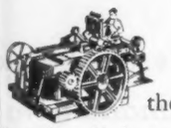
between shafts subject to a maximum deviation from normal of 6. At all speeds and at all angles of deflection these joints deliver to the driven member the same constant speed of rotation that is provided by the driving member.



These are the things that make America strong...the industries that RB&W has served during its 100 years of developing better fasteners for better products.

NO. 5 *Marine*

A *White Spread* OF CANVAS . . .
A PATH OF CHURNING FOAM



SHIPS—for a hundred years—from the beautiful, fast Yankee Clippers and the early steamships to the modern "floating hotels" that in peacetime cross the Atlantic in less than five days, have had their "sea-legs" well fastened on with RB&W bolts and nuts. In this long use of RB&W bolts and nuts by the Marine Industry there is a special tribute to the ability of these products to withstand stress and shock—for what could test a fastener's character more than the constant pound and roll of the sea? . . . RB&W EMPIRE bolts and nuts have been serving on land and sea since 1845. Early in the company's history, it appropriated a sum of money for *research* and *development*—a policy which has been followed with ever-increasing effectiveness to this day. The founder of Russell, Burdsall & Ward invented the world's first automatic cold-header, and in the same tradition, other RB&W engineers have developed other new machines and processes which have helped continually to improve RB&W products in strength, accuracy, and finish . . . Today's RB&W bolts and nuts offer —and so will tomorrow's—the maximum in all the qualities that you ask for in a fastener. From raw material to finished product, they are made by the finest methods, machines and craftsmen, and backed by 100 years of "know-how" in quality bolt and nut making. Make RB&W *your* headquarters for fasteners.

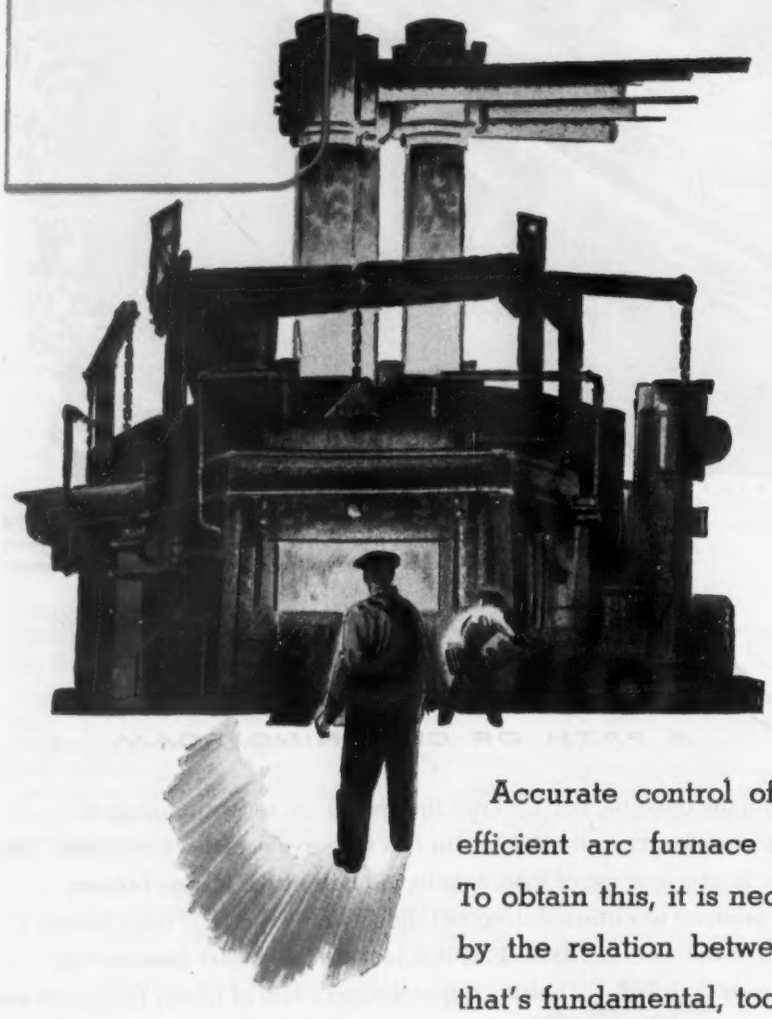
100 Years.. MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

RB&W

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Factories at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. *Sales offices at:* Philadelphia, Detroit, Chicago, Chattanooga, Los Angeles, Portland, Seattle. *Distributors* from coast to coast. The industry's most complete, easiest-to-use catalog.

3 tested methods for...



CHOOSE THE ONE BEST SUITED TO YOUR NEEDS

Accurate control of electrode position—that's the key to efficient arc furnace operation—and *that's fundamental*. To obtain this, it is necessary to control the electrode position by the relation between arc current and arc voltage—and that's fundamental, too. This is a Westinghouse development proved by more than 20 years' use.

Westinghouse has 3 tested-in-use types of electrode control—all operating on this basic principle. *No other manufacturer can offer you this wide a choice.* For complete *unbiased* advice on which type is best suited to your needs, call your nearest Westinghouse representative. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-9465

Westinghouse

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

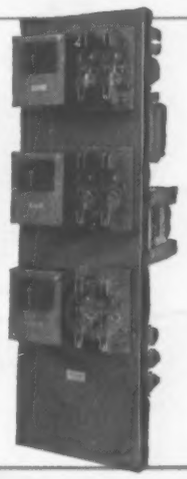
. . Arc Furnace Control

ONLY WESTINGHOUSE CAN OFFER YOU THIS TRIPLE CHOICE

1 BALANCED BEAM REGULATOR

First of the three Westinghouse-perfected methods of electrode control, this regulator may be adapted to any arc furnace equipped with motor-operated electrodes. It applies full d-c voltage to the electrode motors in a series of impulses as established by a mechanical balance of arc current against arc voltage through a beam arrangement.

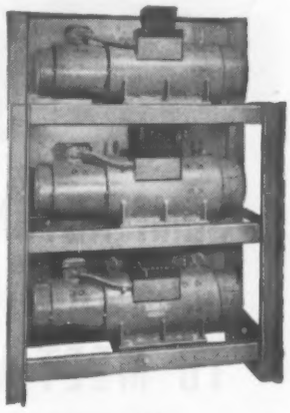
This pioneering method of electrode control became an industry standard, proved in use by more than twenty years of successful application. Its introduction was the first demonstrated proof of the principle, discovered by Westinghouse, that automatic electrode control reduces carbon absorption to a minimum.



2 ROTOTROL

This method of control provides extremely smooth, positive and rapid operation—applying variable voltage to the electrode motors without the use of reversing switches or contactors. The entire control is accomplished by a few simple, substantial devices. A minimum of external connections are required. Plug-in type of individual ROTOTROL units permits immediate replacement. Enclosed construction gives protection from dirt and physical damage.

The principle of ROTOTROL has been proved through more than twenty years of diversified applications in many industries. This latest use, for arc furnace electrode positioning, is based on the knowledge gained through successful adaptations in the welding, mining, machine tool—and many other fields.

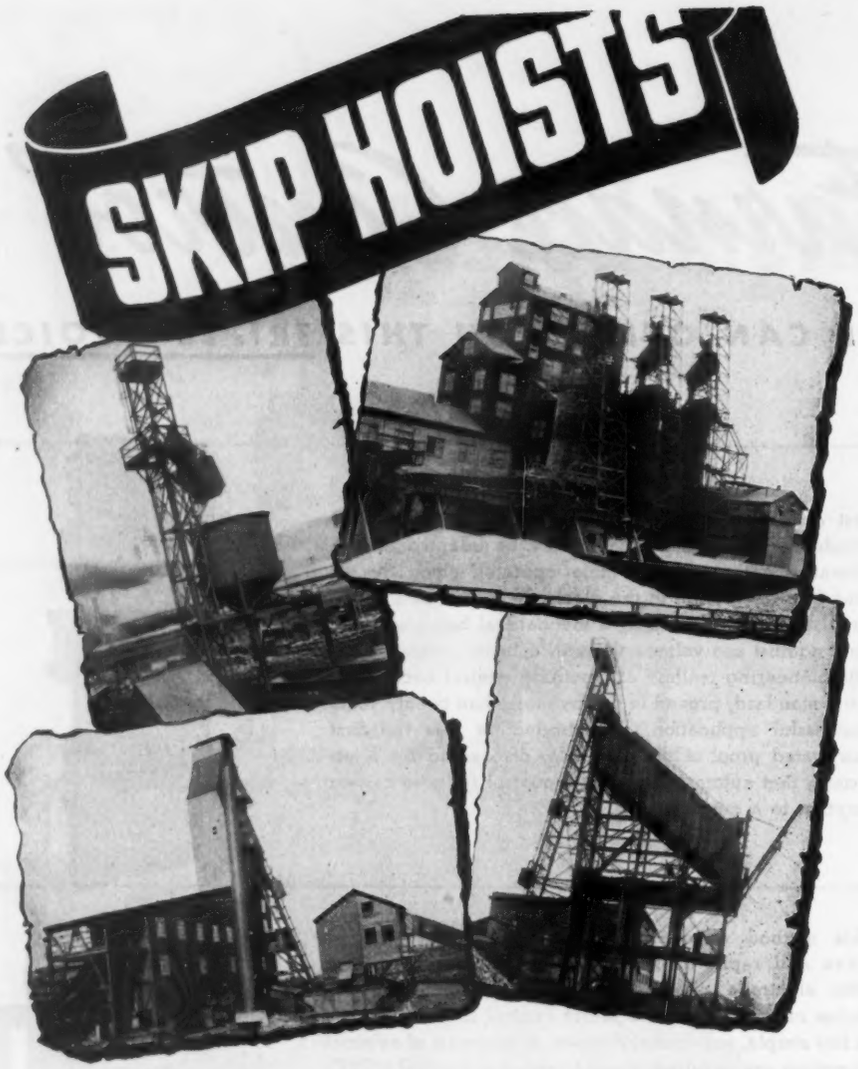


3 ELECTRONIC REGULATOR

For electrode motors of smaller size, this unit offers outstanding advantages. There are almost no moving parts to wear or get out of adjustment. Operation is fully automatic. Response characteristics are adjustable, to suit the needs of the individual application. No separate direct current supply is needed for the electrode motors; the rectifying action of Thyratron tubes meets the needs of the armature; the Rectox rectifier, the field.

In this new electronic regulator, smoothness of operation and accuracy of control are matched by simplicity of installation and economy of space—for sustained, trouble-free service. The assembly consists of standard electronic units, using popular-priced, low-current tubes, conservatively applied for long life.

ELECTRICAL PARTNER OF THE STEEL INDUSTRY



SEMI-AUTOMATIC OR FULL AUTOMATIC COUNTERWEIGHTED OR COUNTERBALANCED TO MEET VARIOUS REQUIREMENTS

● When the lift is high and the material is hot or abrasive, install a Bartlett-Snow Skip Hoist,— they are ideally used in handling limestone, coal, ashes, sinter, coke, coke breeze and similar materials. Reflecting in their design and operation 37 years of continuous improvement and development, Bartlett-Snow Skip Hoists will give you a maximum of long, efficient, trouble-free service,— low operating and low maintenance costs. Capacities from 5 to 500 tons per hour. Bulletin No. 83 completely illustrated, gives full details. Send for a copy today.

THE C.O. BARTLETT-SNOW CO.
6140 HARVARD AVENUE • CLEVELAND 5, OHIO
ENGINEERING AND SALES REPRESENTATIVES IN THE PRINCIPAL CITIES
•
CONVEYING AND ELEVATING EQUIPMENT OF ALL KINDS • CAR HAULS • DUST AND FUME CONTROL SYSTEMS
COAL HANDLING, STORAGE AND RECLAIMING SYSTEMS • FOUNDRY SAND, MOLD AND CASTINGS HANDLING SYSTEMS
CRUSHERS, PULVERIZERS, SCREENS AND FEEDERS • POWER TRANSMISSION EQUIPMENT

Bug Bombs

(*Continued from Page* 119)

ly higher than the outside atmosphere. A curtain of flame at entrance and exit of furnace prevents the entrance of oxygen from the outside air and burns the gas which escapes from inside. The furnace is approximately 50 ft long, and the complete operation, including cooling to 300° F., requires ½-hr. Furnace must cool for 3 days before maintenance engineers can enter to make repairs.

After brazing, plug is welded into the vent hole. Each container is filled with air at 200 psi pressure and submerged in water to test for leaks. Mirrors on the bottom of the testing tanks help inspectors to locate leaks.

A coat of black enamel is baked on by 250-w, infra-red ray bulbs as dispersers in banks of eight slowly revolve past 504 of these bulbs in a 15-ft tower. Tower has a capacity of 840 bombs. Time required for baking is approximately 8 min.

As there are slight differences in the weight of the empty containers due to tolerances in the raw materials, each is carefully checked and marked with a color of paint which indicates its tare weight, as shown in Fig. 4. By reweighing after charging, it is possible to determine the amount of mixture added by the charging process. Without the mixture, each container weighs approximately 11 oz.

Containers are connected to the charging tank in groups of 30 and immersed in a trough of water at a controlled temperature. Difference in temperature between mixture in the storage tanks and water in which the bombs are submerged causes insecticide to flow into the bomb until the correct amount has been charged. If temperature of the water bath were raised, a smaller amount of mixture would enter the container, and, if temperature were lowered, more mixture would enter the container. In this way the charge can be accurately controlled.

Vertical tanks 8 ft tall with a capacity of 2000 lb each are used to supply insecticide mixture to charging stand. Pyrethrum extract and sesame oil are weighed carefully and pumped into tanks from filtering vats. Freon is pumped into the tanks from Freon shipping drums. After filling each mixing tank, a check is made to determine if the contents are according to formula before using. Freon is shipped by the carload in 1-ton drums. A pump beneath each tank keeps the mixture circulating constantly, guaranteeing that the pyrethrum, sesame oil, and Freon are thoroughly mixed at all times. Steam pipes in the tanks keep the mixture at constant predetermined pressures.

After charging, the capillary tube is closed quickly with a special swedging tool. See Fig. 5. Each dispenser is carefully reweighed to be sure an average of 1 lb of insecticide has been added. Final sealing is done with a special electro-forge tool which squeez

TRUFIN
WILL BE SPECIFIED

—if you demand non-ferrous finned tubing for condensers or heat exchangers with sturdiness to withstand severe vibration or extreme heat changes.

You'll want TRUFIN because of its unique construction—all one piece. With the fins and tube integral, this finned tube delivers a service of outstanding merit—with economy and dependability.

TRUFIN is available in root diameters, from ⅜" to 1", and with fins of varying heights and spacings. It can be bent, formed, and handled much like plain tubing.

Send for a copy of "Report on TRUFIN" which gives much technical information about the use of finned tube.

WOLVERINE
TUBE DIVISION
CALUMET & HECLA CONSOLIDATED COPPER COMPANY
1411 CENTRAL AVENUE • DETROIT 9, MICHIGAN

BUY
WAR BONDS

Canada: UNIFIN TUBE CO., LONDON, ONT.

OCTOBER 2, 1941

WE RENEW OUR PLEDGE

Two years ago, at the beginning of the present war with its uncertainties and threats to the future of all industry, this Company publicly pledged itself not to increase its selling prices.

On this, the second anniversary, we again publicly renew that pledge.

During the last two years we have not only kept the pledge previously made, but *we have actually reduced our selling prices by more than* 6% because of more efficient operation made possible by the marvelous cooperation and ability of our organization. This was accomplished in the face of rising labor and material costs, both of which have been increased by considerable amounts.

It is our belief that the only hope for the continuance of the present industrial system now threatened from within and without is in its ability to give more and more to the consumer for less and less of his dollar. This is the strength of American individual initiative. This is the hope of our country's future. If American industry can accomplish this universally, we need not fear dictators either at home or abroad.

THE LINCOLN ELECTRIC COMPANY

Cleveland, Ohio
October 2, 1941

J. F. Lincoln
President

STATEMENT OF POLICY

The world is entering a crisis, the result of which no one can foresee. Other wars have brought inflation, followed by unemployment and depression after peace was achieved. America's experience in the World War illustrates this fact.

Much of this post-war trouble would have been eliminated by a more foresighted price policy on the part of manufacturers and distributors. Price inflation by the seller when he had a dominant position resulted inevitably in reaction with deflation, depression and suffering. Many of those price increases were not warranted.

Before such an inflationary cycle of prices is again started, we publicly pledge ourselves, as far as possible, to maintain present prices.

Further, if the materials we buy are increased in price, or the cost of labor is increased, then we pledge ourselves to raise selling prices no more than the bare increase in cost of raw materials and labor going into our products.

Further, we pledge ourselves to pass on to our customers the reduction in cost made possible by better manufacturing methods, wider distribution and technical advances in production.

THE LINCOLN ELECTRIC COMPANY

Cleveland, Ohio
October 2, 1939

J. F. Lincoln
President

OCTOBER 2, 1939

★ ★ OUR PLEDGE MAINTAINED ★ ★

On October 2, 1939, we announced the policy of "no increase in selling prices". A progress report made October 2, 1941, showed we actually had reduced prices by more than 6% during the period 1939 to 1941.

We have adhered to this policy of price reduction throughout the war years. Despite general increases in the costs of labor, materials and distribution . . . and despite governmental regulations . . . we have been able to maintain or reduce our prices throughout the entire period from 1939 to date.

This has been made possible by our incentive system . . . a method which, if it had been applied throughout industry, would have doubled America's output of war goods for a quicker Victory and would have cut the cost of the war by 50%.

America's future depends largely upon her *efficiency of production.* Our proved incentive system has in it the seeds of a satisfactory answer to the difficulties of this nature in industry.

THE LINCOLN ELECTRIC COMPANY

Cleveland 1, Ohio
May 7, 1945
Victory in Europe

J. F. Lincoln
President

Time and Cost
Saver
Stamping from ThomaStrip pre-coated with zinc saves finishing operations.
Stamping from uncoated steel requires further operations—cleaning and plating.

BY PRECOATING cold rolled strip steel at the mill, Thomas does the plating job for you. This method is far more economical than plating of parts after they have been formed. It reduces or entirely saves handling, clerical, maintenance, and production costs. Remember, too, that with precoated ThomaStrip you obtain peelproof, uniform coatings on the inside and outside surfaces of your parts, regardless of how complicated they may be. Write today for helpful information or send samples.

ThomaStrip
COLD ROLLED STRIP STEEL

ELECTRO-COATED ZINC, COPPER, NICKEL AND BRASS . . . HOT DIPPED TIN AND SOLDER . . . LACQUER COATED IN COLORS . . . UNCOATED PRECISION STRIP, CARBON AND ALLOY SPECIALTIES.

THE THOMAS STEEL CO. • WARREN, OHIO
COLD ROLLED STRIP STEEL SPECIALISTS

and welds the tube perfectly in one lightning-fast operation. After being cleaned in washing machines, sealed containers are given a final test for several minutes in warm water, which increases temperature inside the bomb and makes leaks easier to find.

After a final weight check, bombs are sprayed with quick-drying lacquer, as in Fig. 6. A rotary printing machine prints directly on the bomb the label and instructions for use. This printing cannot be obliterated except by destroying the finish on the can itself.

The seal cap is inserted in its niche and held in place with waterproof tape, as shown in Fig. 1. After final inspection, bombs are packed 24 to a case to army export specifications. Cases have three layers of V board (grade 3) on the top and bottom and two on the sides. Cases are sealed with waterproof glue and wire-bound.

Use: When ready for use, the dispenser is inverted, protruding end of the capillary tube is broken off, and the container righted. As 1 lb of insecticide is sufficient to "de-bug" 15,000 cu ft, the equivalent of 240 pup tents or 50 giant bombers, the container can be used many times before being exhausted. When the area has been sufficiently saturated, the bomb is again inverted and the seal cap screwed on the threaded nipple.

The insecticide used in bug bombs going to the armed forces was developed especially for mosquitoes. It also is effective for flies, wasps, and gnats, and fairly effective for roaches. Numerous experiments now are in progress to develop insecticide mixtures for the control of other disease-carrying insects as well as of many pests found in everyday life.

Lubricant Reduces Drill Breakage

A new drill lubricant, developed by E. L. Flood of Consolidated Vultee Aircraft Corp., San Diego, Calif., is known as the "Elf" drill lubricant. It is the result of a series of tests conducted to obtain a drill lubricant that could be handled easily and applied so as to provide maximum life for the cutting tool without causing hole distortion or necessitating removal of excess lubricant from work to be painted.

It has a paraffin wax base and has a heavy consistency, looking much like shoe polish. Lubricant is packaged in cylindrical cardboard containers, each with a diameter of 2 in. and length of 3 in. It can be applied simply by running a drill through the cardboard container. Lubricant is claimed to provide a 25 per cent increase in drill life by cutting down on drill breakage; to prevent welding of duralumin to point of drill; to help eliminate hole elongation, even when drilling through three thicknesses of material; and to decrease drill operating temperatures by 15 to 25 per cent. It is produced commercially by Aviation Lubricants Co., Box 1607, San Diego.

THIS RADIAIR OVEN IS VITAL IN WAR—VALUABLE IN PEACE
Wartime Uses—drying small airplane wing sections, large stampings, metal panels and semi-large flat parts. **Peacetime Uses**—drying name plates, bottle caps, lacquered paper ceramic dishware, panel surfaces.

Infra-Red RADIANT HEATING IS A PRECISION PRODUCTION TOOL!

C. M. HALL *Radiair* INFRA-RED OVENS

Fit Right Into the Production Line... Set New Standards of Industrial Heating ★ Drying ★ Baking ★ Dehydrating

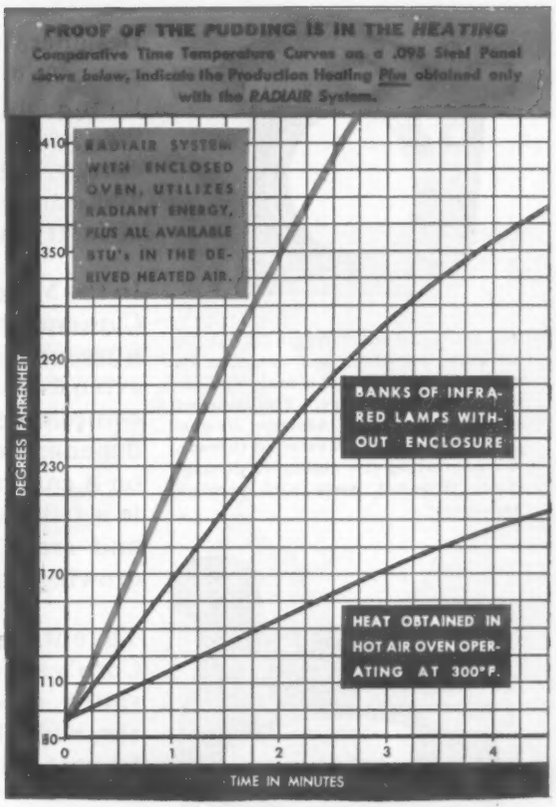
Old established methods of heat transfer and many conventional heating practices are being obsoleted by the increasing acceptance and use of infra-red radiant heating as a precision production tool. Meeting the complex demands of war production finishing has put infra-red radiant heating with its new techniques right into the production line, supplementing, complementing or taking the place of present heating equipment.

C. M. Hall RADIAIR Ovens always have incorporated the *time-saving benefits* of instant heat through radiant energy and the *extra-use value* of recirculated derived heated air to produce greater overall thermal efficiency.

The economies of RADIAIR heating vs. other heating systems cannot be made on a basis of unit-of-heat cost alone, since RADIAIR oven Users find that many other advantages make it a real cost saver. These advantages include, *greatly increased production, lower equipment, installation and maintenance costs, greater flexibility and ease of control, reduced space requirements, added safety* and *cleanliness.*

It will pay you well to learn NOW, just what C. M. Hall *Productioneered* Radiant Heating has to offer in meeting your War and Postwar production needs. You will find you were wise to CALL ON HALL FOR HEAT.

"INFRA-RED AT WORK" *describes the many practical applications of this new production heating process.* **SEND FOR A COPY TODAY.**

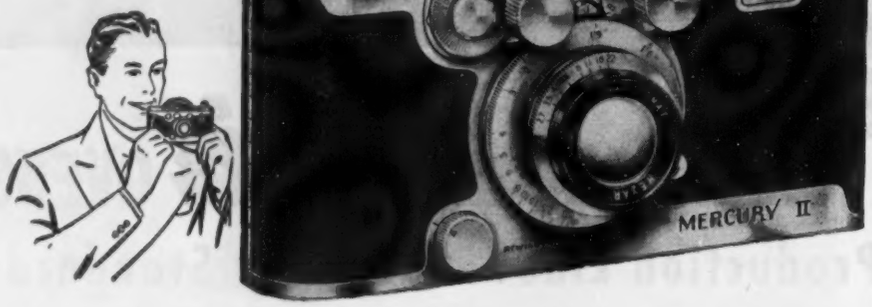

PROOF OF THE PUDDING IS IN THE HEATING
Comparative Time Temperature Curves on a .093 Steel Panel shown below, indicate the Production Heating Plus obtained only with the RADIAIR System.
RADIAIR SYSTEM WITH ENCLOSED OVEN, UTILIZES RADIANT ENERGY, PLUS ALL AVAILABLE BTU's IN THE DERIVED HEATED AIR.
BANKS OF INFRA-RED LAMPS WITHOUT ENCLOSURE
HEAT OBTAINED IN HOT AIR OVEN OPERATING AT 300°F.
DEGREES FAHRENHEIT
410
350
290
230
170
110
80
0
1
2
3
4
TIME IN MINUTES

C·M·HALL *Lamp Company*

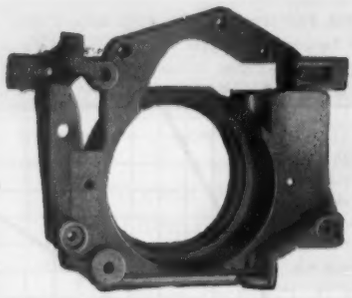
PIONEER DESIGNERS AND BUILDERS OF INFRA-RED RADIANT HEATING EQUIPMENT

1005 EAST HANCOCK ST. ***Representatives in Principal Cities*** **DETROIT 7, MICHIGAN**

DIE-CASTING ACCURACY DEMONSTRATED IN PRECISION CAMERAS



Universal Camera Corp. Selects Advance Die-Castings for Their Complex, Miniature Mercury Instrument.



The zinc mechanism frame die-cast by Advance, on which are mounted no less than 238 parts is a marvel of intricacy with accuracy. The focusing mount includes an Advance die-cast inner sleeve with cast external threads, demonstrating the ability to die-cast finely threaded parts with extreme accuracy.

Designers of high speed miniature cameras of today and tomorrow are finding modern precision die-castings essential to the amazing accuracy, light weight, compactness and economy which make this type of instrument immensely popular.

In the Mercury II, made by Universal Camera Corp., of New York, aluminum and zinc castings are employed extensively. The fact that numerous complicated die-castings can render dependable precision performance on a camera only 5½" x 2¾" x 1⅜" is a tribute to the engineering skill and craftsmanship of this rapidly growing industry.

The enthusiasm of Universal Camera Corp's engineers over the use of Advance die-castings is prophetic of the widening scope of die-castings in post war fabrication.

ADVANCE PRESSURE CASTINGS, INC.

ENGINEERS, DESIGNERS AND MANUFACTURERS OF DIE-CASTINGS OF "QUALITY WITH ECONOMY"

42 NORTH 15th STREET, BROOKLYN 22, NEW YORK

Tooling Ways

(*Continued from Page* 121)

index template during the stack drilling operations.

The index template is attached to a suitable fitting on the transverse straight edge of the tooling ways, and its use facilitates rapid movements from station to station in the process of establishing tooling locations.

When reproduced in the form of a master tooling layout, the master layout becomes the sole source of reference for making the index template, strip template, and other templates for the fabrication of parts. Therefore, complete coordination of all tooling holes may be attained, making it unnecesary for workmen to refer to drawings in order to ascertain dimensions.

In the matter of tool proofing, it should be borne in mind that the function of the tooling ways is to effect a physical mastering of numerous assembly tools in accordance with loft master layouts and basic engineering dimensions. Tool proofing begins with inspection and approval of the loft reproductions and the templates derived therefrom. The means of producing reproductions of the master layouts are investigated as to dependability and the reproductions consequently released are stamped "approved" by the tool proofing division.

Master Layouts Are Drilled

The lines layout on a given template usually establishes the pattern of holes required for structural assembly and coordination; and, because the tolerances required for these cylindrical fits are usually at subvisual limits, it is desirable that one of the master layouts be drilled and used as a master for reproductions. Inspection for hole layout may then be physically checked against this master by means of plug gages only.

Each step involved in operating the tooling ways may be quickly and easily checked with a few standard plug gages and a "feeder." For example, with the setting of the last locator from an index template, the tool proofer needs only to plug into two holes; then the finished jig or fixture is completely inspected, ready to be put into use. Strip templates alone can be used for rechecking purposes, and for restoring original set-ups.

Like the master tooling dock, the tooling ways greatly facilitate the construction of small and accurate contour models by providing a means of positioning quarter-inch contour templates on steel skeletons or frames for such "mock-ups." When the templates have been positioned on the model, the job can be completed by covering the structure with reinforcing mesh and fairing in with hard gypsum; and, if the lines layout is complex, the straight edges of the tooling ways may be used to guide the "mouse" during the scribing operations.

For jig boring, the tooling ways have even greater possibilities. By dispensing with the verticals and using the transversal to locate stations on the long

Especially.. FOR HORIZONTAL FILLET WELDS ON MILD STEEL— RACO 20 ELECTRODES

Used particularly in positioned production welding of a wide variety of plate assemblies—in shipyards for welding bulkheads, hatch girders, deep tanks, etc. . . . in other industries for welded car frames, roll pipe welding and welded machinery. RACO 20 Electrodes may be used with equal success on direct or alternating current.

These electrodes meet the requirements of:

A.W.S.—A.S.T.M. Specification A233-43T, Type E-6020
U. S. Navy Bureau of Ships Specification 46E3 (INT)

Grade II, Class 2

Other RACO Mild Steel Electrodes:

RACO 5—For deep grooves. A.W.S. E-6030
RACO 7—All position, reverse polarity. A.W.S. E-6010
RACO 8—General purpose, poor fit-up. A.W.S. E-6012
RACO 11—All position, A.C. A.W.S. E-6011
RACO 13—General purpose, light gauge. A.W.S. E-6013

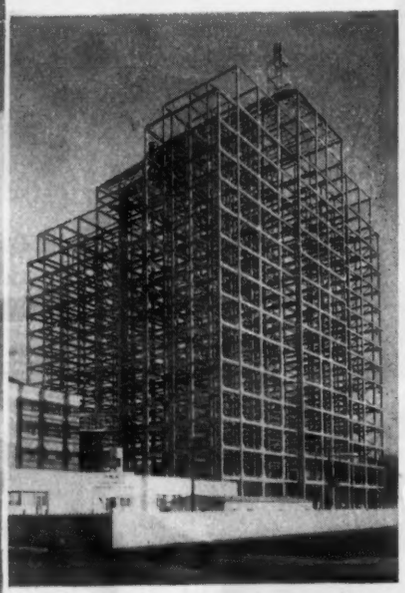
All RACO Electrodes must comply with the highest standards of quality Convince yourself—send for samples

The REID-AVERY COMPANY
INCORPORATED
DUNDALK • BALTIMORE 22 • MARYLAND
SINCE 1919 PRODUCERS OF ARC WELDING ELECTRODES AND WELDING RODS

Confidence Counts

when you buy Fabricated Steel

Ingalls prides itself on its ability to produce fabricated steel efficiently and economically, to meet rigid specifications and to deliver on time. Through the years the company has gained an enviable reputation for dependability — a definite asset to its customers. For instance, one large company no longer asks for bids. Knowing from experience that the cost will be reasonable and the job done right, the company calls on Ingalls for all its fabricated steel needs. Look to Ingalls now and after the war for the latest developments and economies in utilizing welding for the fabrication of structural steel and plate work.



INGALLS
STEEL

THE INGALLS IRON WORKS COMPANY, THE INGALLS SHIPBUILDING CORPORATION, The Steel Construction Company, Birmingham Tank Company. Offices at BIRMINGHAM, New York, Washington, Pittsburgh, New Orleans. Fabricating plants at Birmingham and Pittsburgh. Shipyards at Pascagoula, Mississippi, and Decatur, Alabama.

tudinal straight edges, the device becomes analogous to a jig borer. Actual drilling or boring may then be accomplished by locating a suitable fitting on the transverse straight edge and using a table drill or boring head to make holes in the material which is supported in a horizontal position beneath the fitting. A drill bushing in the fitting insures the accuracy of each operation.

In jig boring operations, the tooling ways could handle precision layouts with dimensions of as much as 720 x 109 in. in approximately half the time that would ordinarily be required for such work. A jig borer with working limits of 60 x 40 in. and incapable of universal application would cost approximately $30,000—almost twice as much as the cost of the initial tooling ways installation at San Diego.

Efficient use of the tooling ways makes it possible to apply line production techniques in the construction of assembly tools, because the flow of tools through the ways is akin to the flow of parts on a mechanized assembly line. The old method of assigning lead men to the responsibility of building specified fixtures from start to finish has given way to the system of organizing groups of specialists. Examples:

(1) A group that specializes in the cutting and making of rough structures.
(2) A group that specializes in the finishing operations of locators from templates.
(3) A group that specializes in drilling and machining operations for fittings.
(4) A group that specializes in assembling fixtures in the tooling ways.
(5) A group that does pick-up work such as installing clamps, applying stencils, painting and positioning fixtures in the desired locations on the assembly line, etc.

The co-ordination of the activities of these groups can be effectively administered through the production control group that takes care of the ordering of material, the procurement of essential drawings, template and tool orders, etc. It has been found that such reorganization, in itself, can cause a reduction in costs and time of approximately 50 per cent and, simultaneously, it facilitates the co-ordination of the tooling program with preplanning schedules.

Pure Hydrochloric Acid Made by Low-Cost Process

A new process for making water-free hydrochloric acid of over 99 per cent purity, without explosion hazards is used for making certain types of synthetic rubber and resins and as a catalyst in refining high-octane gasoline. Installation requires only standard construction materials. Advantages include low operating expense and production of sulphuric acid as a by product. Process involves use of chlorosulfonic acid. Inquiries may be addressed to Grasselli Chemicals Dept. duPont Co., Wilmington 98, Del.

Cross-section of Ring Making at Dresser

Red areas indicate machining saved.

.... use this experience to save ring costs

For more than 50 years Dresser has been making rings of all types, with a wide variety of cross sections. From this long experience Dresser has accumulated a "know-how" which is now saving time, manpower, equipment, material and machining costs in the production of circular parts for War and Industry.

Dresser has manufactured all the above cross sections at some time or other—in many diameters. These rings are produced by rolling and welding special mill sections. Some cross sections are obtained by combining rings, shrinking or expanding to make the required assembly.

In all of these rings, expensive machining is saved. Sections have minimum dead areas to be machined . . . and finished dimensions are so accurate that in many cases no further machining is necessary.

Extensive facilities are available for quantity production, and expert engineering service is available to help you redesign your product for welded construction. Whatever your product or problem, send us your inquiries for rings of any shape or size.

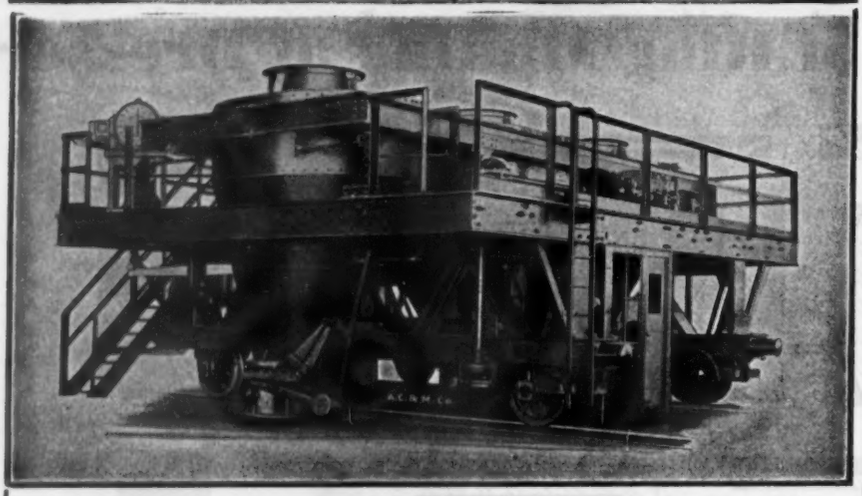
★ ★ ★

DRESSER MANUFACTURING DIVISION
Bradford, Pennsylvania
In Canada: Dresser Manufacturing Co., Ltd., 60 Front St., West, Toronto, Ontario.

DRESSER **RINGS and FORGINGS**

ONE OF THE DRESSER INDUSTRIES

COKE OVEN EQUIPMENT



COAL CHARGING CARS

Atlas coal charging cars are preferred equipment on most ovens because they are designed to suit operating conditions exactly, and include those design features which insure dependable operation with low maintenance.

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ATLAS COKE OVEN EQUIPMENT

Clay Carriers • Charging Cars • Door Machines
Coke Guides • Quenching Cars and Locomotives

The ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS
1100 IVANHOE RD. CLEVELAND, OHIO, U. S. A.

Sponge Iron

(*Continued from Page* 123)

briquettes formed by compressing the fine size particles of sponge iron produced in the reduction furnace. These sponge iron briquettes, containing approximately 89 per cent total iron, will also contain a small amount of unreduced iron oxide.

The briquettes will be shipped to the Republic plant at Canton, O., where they will be charged as scrap into electric furnace. These furnaces require an appreciable tonnage of low-carbon scrap free from contamination with alloys, and it is anticipated that these sponge iron briquettes will satisfactorily replace part of the normal scrap charge. This project was initiated and approved in 1942 when low-carbon alloy free scrap for electric furnace charge was extremely scarce. At the present time this grade of scrap is still relatively scarce and Republic is having some difficulty in obtaining it in adequate quantities.

Product Cost: It is difficult, at this time, to estimate accurately the cost per ton of the sponge iron briquettes, as this cost will depend upon many factors that cannot be determined until a normal plant operation has been obtained.

Construction Time: From the date the project was approved in the fall of 1942 until May 1943, the time was spent in working out a proper plant design, as the design submitted in the fall of 1942 by the originators of the process was only preliminary. Final approval of the modified plant design was not obtained until Aug. 9, 1943. Construction was started on Aug. 31, 1943. Construction has been materially delayed due to the time consumed in concurrently working out details of design and the preparation of revised drawings, in the ordering of proper equipment and in the delivery of equipment and materials. The unavailability of skilled and unskilled labor has also been a contributing factor in delaying the completion of the project.

Estimated Cost of Project: The present estimated cost of the project of $1,132,000 is considerably more than the original estimated. The original estimate was based upon an incomplete design of the plant. Moreover, the major items of equipment are of special design and the original cost estimates of these items were wholly inadequate.

Future of Sponge Iron: It is hoped that the operation of this experimental plant will furnish answers to many of the present questions relative to the successful production of sponge iron and will also furnish some definite evidence as to the cost of such production and the commercial and competitive value of sponge iron to the steel industry.

This operation should indicate whether or not sponge iron can satisfactorily compete with scrap or whether the use of sponge iron is limited to the production of only certain high-grade steels for which the sponge iron may have

How Murex Stainless Steel Electrodes Stopped a Front-Office Feud

I saw we were in for a grim front-office hammer fight, complete with bashed-in tin crowns and spattered executive blood. For weeks Old Flagg, our Purchasing Agent, had been going over our purchase orders, trying to trip up Charley Pratt, his assistant and my boss. Old Flagg's not mean, really: it's just his idea of efficiency. Only now it had stopped being tiresome and become maddening, especially as he at last had Charley out on a limb.

"Murex does so make A.C. Stainless Steel electrodes!" Charley practically yelled, right in the old mule's face. "Isn't Murex one of the leading manufacturers of arc-welding rods? Haven't we bought their stuff for years? Of course they make Stainless Steel electrodes for use on A.C. and D.C. both! And darned good ones, I assume."

"See?" Old Flagg barked, triumphantly. "You don't know if they make them or not: you assume. Now when I was a young man, just starting up the ladder of success..."

I'm only a secretary, but that's where I stepped in. I've heard, nine million times, the tale of Old Flagg's thrilling Rise To The Top. Besides, if the feud went much further, I'd have the bother of breaking in a new boss.

I therefore said sweetly, "Gentlemen, I do not mean to rush in where even Joe Louis would fear to tread. But why don't we walk across to the shop and ask Tom Belt, the arc-welding super?"

We walked across and asked Tom. He didn't like to say too much, Old Flagg being present. Instead, he just pointed at the new Murex Wall Chart tacked up over his desk. It listed Murex's thirty-odd electrodes, divided by class: for mild steel, low-alloy steel, hard surfacing—and Stainless Steel both A.C. and D.C.*

I thought Old Flagg would hum and haw, and keep beating on Charley on general principles. Instead, as a peace offering, he treated Charley and me to a swell lunch up in the very plush senior executive dining room. You may not get a free lunch out of it, or stop any front-office wars, but if you have anything to do with arc-welding, you should have a copy of the big Murex Wall Chart handy. A postcard will bring you one.

*The Murex Stainless Steel electrodes the above excitement's about are 18/8, 18/8Cb, 18/8 Mo, Type 347, 19/9 Mn, 25/20 and Type 310. 18/8 Mo, Type 347 and Type 310 operate either on A.C. or DC., and the others on D.C.

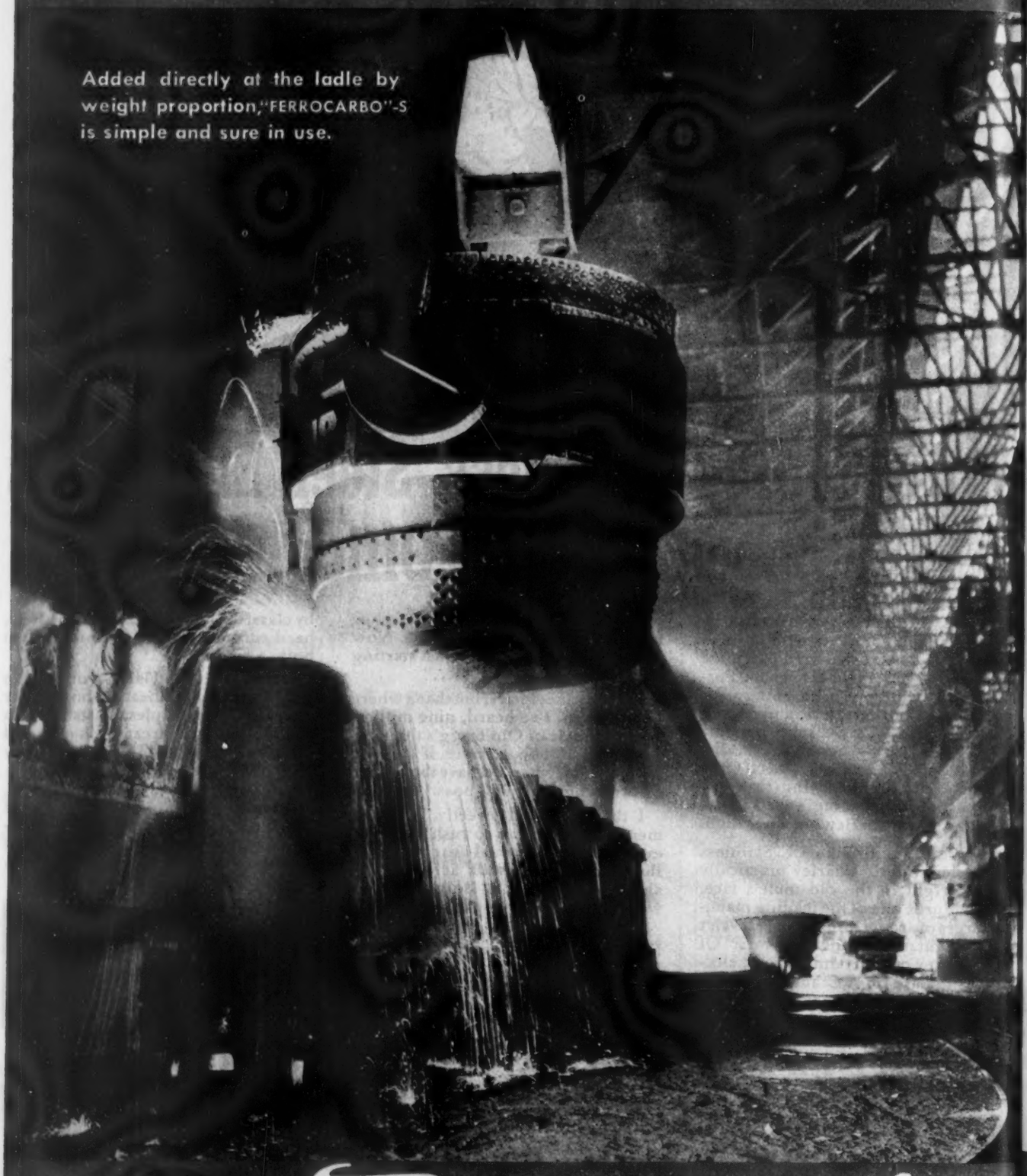
METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK 5, N. Y.

ALBANY • CHICAGO • PITTSBURGH • SO. SAN FRANCISCO • TORONTO

MUREX Electrodes

"FERROCARBO"-S



CARBORUNDUM

Ferrocarbo

prolongs fluidity...

New Ladle Treatment Increases Ingot Yield

DEOXIDIZING with "FERROCARBO"-S gives a prolonged increase in the fluidity, resulting in a greater yield of steel from the ingot.

Here is the gain that one steel mill reports from using "FERROCARBO"-S:

▷ **Yield from "FERROCARBO"-S-treated alloy steel 95.2%**

▶ **Yield from same alloy steel with previous practice 92.6%**

(Six months' performance of a 22" mill)

The yield from previous deoxidation methods includes all carbon contents—low to high. The figures for "FERROCARBO"-S-treated steel includes LOW carbon contents only (0.15% to 0.25%).

Prolonged fluidity, resulting from the use of "FERROCARBO"-S, leaves fewer inclusions which are better dispersed. There is marked improvement in ingot surface—which means less scarfing. This adds up to increased yields with all types of steel.

Other notable advantages offered by "FERROCARBO"-S are: *inclusions reduced and stringers eliminated by thorough deoxidation; added ductility, and in fine-grained steels, reduction and dispersal of inclusions.* Moreover, under controlled conditions, increase in hardenability can be effected.

For detailed information on "FERROCARBO"-S, consult our metallurgical staff. Write The Carborundum Company, Refractories Division, Department R-6, Perth Amboy, New Jersey.

* * *

"FERROCARBO" distributors are:

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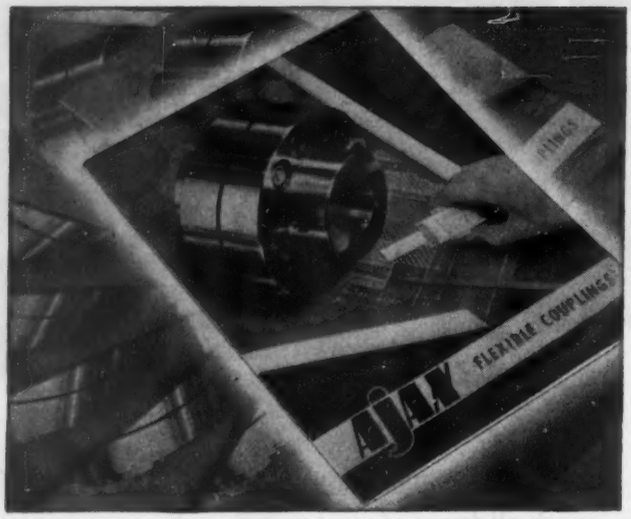

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qualities superior to that of ordinary scrap. It is also hoped that this operation will furnish some definite information as to the feasibility of producing sponge iron at isolated iron ore properties throughout the country.

Status of Project—April 17, 1945

Operation: Approximately 2000 tons of iron ore concentrates were charged for experimental reduction which resulted in a product ranging from totally unreduced material to highly reduced material of which approximately 400 tons averaged 75 per cent or more metallic iron.

Disposition of Production: A careful selection was made of a small tonnage of the foregoing product which was then reasonably well briquetted. This was used in a heat in an electric furnace with satisfactory operating results. None of the product was used for an open-hearth charge as it was not properly briquetted and was too fine and dusty. Consequently with the exception of the small tonnage used in the electric furnace heat, all of this material was put over sintering machines and prepared for charging in the blast furnaces. This material had no additional value so far as the reduction was concerned.

Present Situation: In the experimental operation of this plant, reduction was made at a rate of approximately 24 tons per day but during that time, the material could not be briquetted due to the present inadequate briquetting press and the reduced material accordingly had no additional value. Additional funds have been requested to install an adequate briquetting press and make other changes which the designers of the plant and the operators think should be done to make a satisfactory plant.

Recommendations Made for Fire Extinguisher Location

Portable fire extinguishers should be placed where they are available and access to them not likely to be cut off by fire, according to Safety Research Institute Inc., 420 Lexington avenue, New York 17. They should be situated so that one large or two small units can be reached by traveling no more than 50 ft from any point in the area. To safeguard a specific fire hazard, units should be mounted near it, but not on or so close to it that they will be involved in case of fire. If hazard is located in a relatively small room, extinguishers should be mounted either just inside or outside doorways leading into the room, making them easily accessible.

Units may be mounted on column or walls, with hangers, brackets or shelves as supports. Tops of easily handled units should not be more than 5 ft from the floor, and heavy units not more than 3 1/2 ft. Extinguishers also should be placed where they can be seen easily or locations marked with conspicuous signs. Anything interfering with accessibility should be eliminated.

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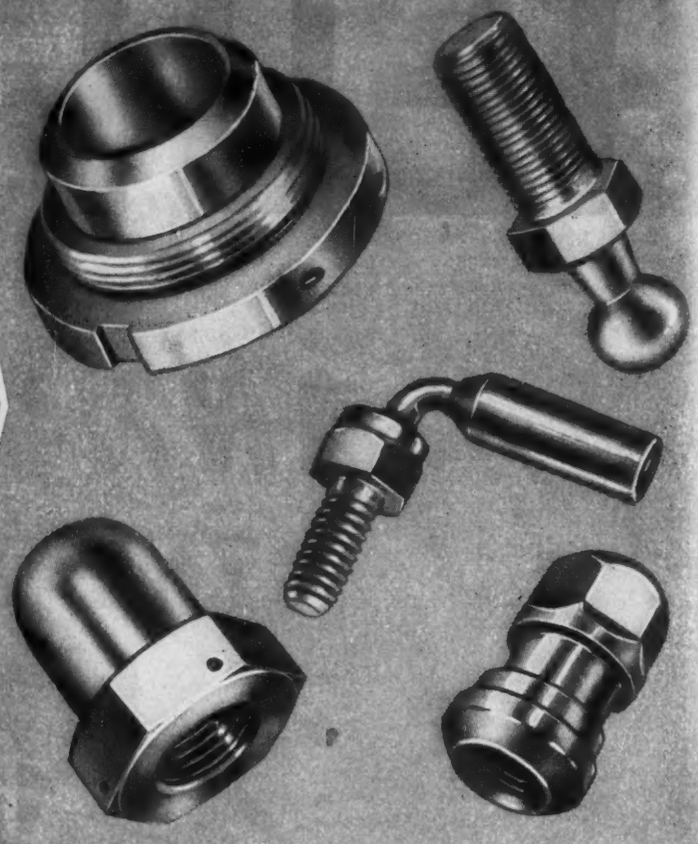

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TOUREK

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Intermittent Acting Mill

(*Continued from Page* 139)

leaving each notch; and second, the small rollers must have exactly the right angular spacing so that all of them will enter the notches at the same time. These objects are effected by cages 12 at the ends of the small rollers (Fig. 10). Integral with or attached to each cage is a ring gear 13, co-acting with a pinion 14 and moving at one-half the angular speed of the large roll 1. The cages may be, but are not necessarily, driven from the large roll 1; all that is necessary is that by means of pinions and shafts the cages at the two ends be kept in exact angular position with respect to each other, as they turn. Means (not shown) are provided for accurately adjusting the angular position of one cage relative to the other when the mill is at rest. An arrangement with a certain amount of elasticity or spring-yielding should be provided in the cages, so that if some slight slip of any of the small rollers should occur while under pressure, the parts of the cages engaging the ends of the rollers can yield slightly, and yet spring back when the small rollers enter the notches, so as to put the rollers into exactly the correct positions when they again enter into contact on reaching the end of the notches.

Driven From Large Roll

There are certain advantages in driving the cages from the large roll, and in that case the half-speed gearing driving the cages is correct regardless of the diameter of the rollers, but of course all rollers used at a given time must have the same diameter.

Two means are provided for adjusting for different strip thicknesses and reductions. First, the rollers 2 can be easily and quickly removed and replaced by others of larger or smaller diameter. This is done by removing retainers 15 (Fig. 10) and slipping each roller out radially from the cages as it is turned to the gap in the outer housing 6. Second, the hard steel sleeve 3 can be changed in curvature, being elastically bent by forces applied on its outer surface by means of the stepped-wedge pieces 4 and 5, (Figs. 9 and 11). The inner pieces 4 are prevented from moving endwise or parallel to the roll axis, while the outer pieces 5 are moved or adjusted endwise by screws or other means (not shown) at the end of the roll. Either each wedge piece 5 is provided with a separate adjusting means, or else a fairly flexible steel ring contacting the ends of all pieces 5 is adjusted by perhaps six screws or the equivalent, evenly spaced around the circumference; in this way, those of the pieces 5 which are near the place where the strip leaves, could if desired be moved inward further than those near the place where the strip enters, thereby moving liner 3 closer to roll 1 at this place and producing greater reduction of a given thickness of strip without requiring a change or adjustment of the

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position of the large roll 1 in relation to anvil 6. With a 24-in. diameter roll 1 and ½-in. thickness of sleeve 3, a radical adjustment of 0.062-in. could be effected without exceeding a bending stress of 60,000 psi in the hard steel sleeve. As this mill is intended for strip not exceeding 0.062-in. initial thickness, this amount of radial adjustment is even more than required.

The drum 8, (Fig. 9), which produces the tension in the strip leaving the mill, is spring-loaded rather than weight-loaded, so that it will act quickly to take up the slack in the strip as the rollers 2 reach the notches, and also so that its inertia will not cause excessive tension in the strip.

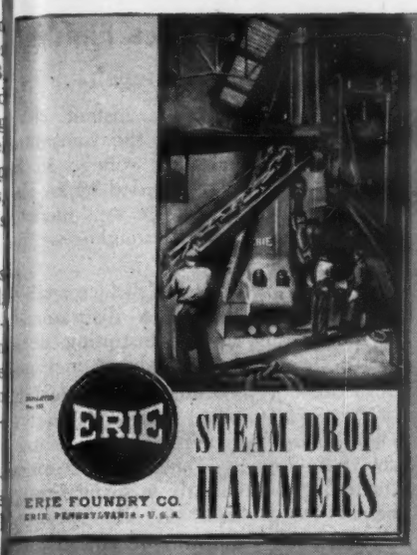
To counteract any difference in appearance of the strip surface on the two sides due to the fact that the small rolls always act on one side of the strip and the concave surface always on the other side, the use of two assemblies is contemplated, one as shown in Fig. 9 and the other a duplicate but turned with the opening in the C-shaped housing 6 facing toward the left (referring to Fig. 9); the strip coming out of the bottom of the opening in the left-hand unit would enter at the top of the opening in the right-hand unit. The finished strip would emerge at the bottom of the opening in the right-hand unit, moving leftward. Each side of the strip would then have been worked on by the small rolls.

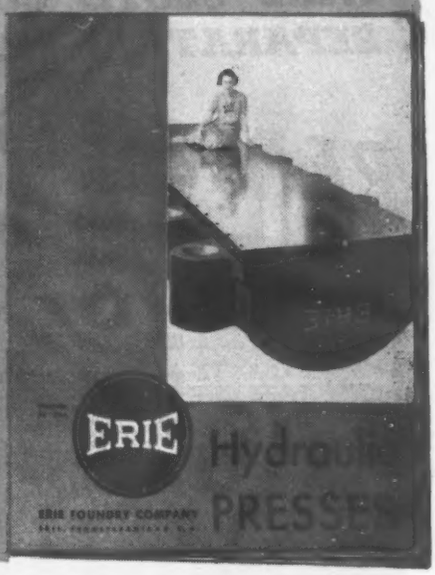
Because of the intermittent motion of the strip (peculiar to this mill), and the successive alternations of application and release of roll pressure (common to all types of intermittent-action mills resulting in a certain amount of impact it is improbable that this mill could be operated at as high a strip speed as the conventional continuous-action mill. But in view of the speeds attained (by means of correct design) in intermittent-action paper handling and printing machinery without tearing the comparatively fragile paper, it seems probable that speeds high enough to insure successful commercial application could easily be attained with this mill.

The foregoing analysis of various intermittent-action mills shows that while none of them is free from certain disadvantages, all have good possibilities for certain applications. The course of invention will probably lead to still other types, which may prove even more suitable for the purposes for which they are designed.

—o—

A new series of "Vital Diesel Oils" SAE 10 to 50 inclusive, made by E. F. Houghton & Co., 303 West Lehigh avenue, Philadelphia 33, are of detergent type and embody highly stable solvent-refined stocks. They are given a treatment which makes them resistant to oxidation or formation of sludge or corrosion of bearings. Oils conform to U. S. Specification 2-104B covering heavy-duty lubricants. Folder describing oils is available upon request.





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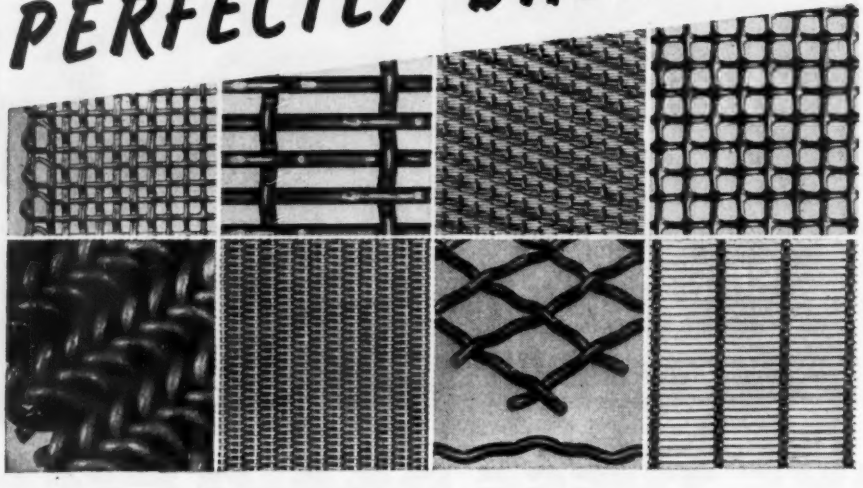

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Evaluating Surface Finishes

(*Concluded from Page* 144)

photocell at any particular instant. Fl tuations of intensity of the transmitt light cause a pulsating voltage in t cell circuit which is recorded by an el tronic voltmeter. Voltage thus increa with increased surface roughness. S Fig. 2.

An overall view of the surface analy is shown in Fig. 3. A diagramm sketch of this device illustrating det of the electric circuit is shown in Fig.

In order to ascertain the practicabil of the replica method for surface analy Herschman examined the five specime shown in Fig 4. These differed amo themselves significantly in surface roug ness. Detail data on the specime shown in this illustration are given Table I. The characteristic contour the profile (determined with a micr

TABLE II

Typical Results Obtained on Duplicate Replic Prepared Without the Use of Dye

Type Finish	Replica Number	Reading Replica Analyz mvX10
Moderately coarse shapered finish	1A	63
	2A	62
	3A	65
Finely ground finish	1	9.6
	2	9.8
	3	10.0

scope) for each specimen is shown in Fi 6. Typical results obtained on duplica color-free replicas are given in Table I

Studies also have shown that t replica method of surface analysis especially sensitive to small changes surface roughness for the finer grad of metal finish. This is of particul interest because it is within this ran that many of the conventional means f evaluating metal surface finish are n sufficiently sensitive.

The discussion by Herschman lis some of the salient features of the repli method for surface analysis of meta They are: (1) Easy maintenance of permanent record of a metal surfa finish; (2) rapid average evaluation a considerable length and width of t surface at one sitting; (3) simplicity operation; (4) absence of the person factor; (5) preservation of a surfac even for soft materials such as lead tin-base bearing metals; and (6) avail bility of the method, since the repli may be prepared in one locality an transported to the location of the an lyzer. In addition, it is pointed out th this procedure also may prove useful evaluating surfaces not readily accessib with present means for surface analys There also are indications that the metho described may be applicable for evalu ting the corrosion pitting of metals.

REFERENCES

[1] Research Paper RP1625.

[2] Rex D. McDill, Engr., 5109 Mayfield R Cleveland Heights, O.

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THE BUSINESS TREND

Business Highlighted by Rise in Construction

RELAXATION of some government wartime controls over construction points to increased activity in that field in coming months. Although most building supplies are shorter now than at any time since the war started it is believed that they will become more plentiful in the next few months because of discharged war veterans easing the manpower shortage and cutbacks in war contracts making increased quantities of materials available for civilian work.

Apparently inspired by relaxation of some controls, contracts for construction awarded in the latest week stand out prominently among the various business indicators which otherwise are holding relatively stable. The week's total of construction awards, $59,216,000, not only is the highest this year but is the highest reported since Aug. 31, 1944. The latest figure exceeds the preceding week's total by 38 per cent, is 102 per cent above the corresponding 1944 week, and exceeds the previous four-week moving average by 49 per cent.

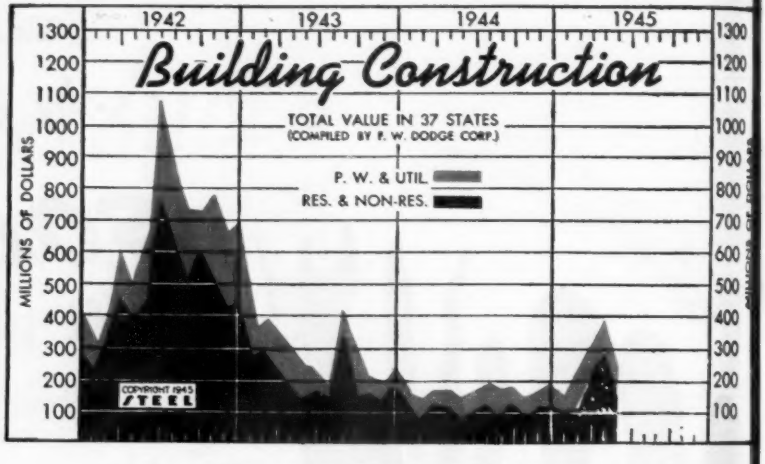
While the construction field is showing a decisive response to lifting of some wartime controls, most other business indicators continue relatively unchanged. Steel ingot output has been on the downtrend recently, but the decline has been due to strikes at Birmingham, Pittsburgh and Cincinnati, and not to lessened demand for steel.

COAL PRODUCTION — Daily average coal production in the latest week was 135,000 tons above that of the preceding week but 63,000 tons under the daily average of the corresponding period of 1944. Coal output thus far in 1945 is 262,125,000 tons, or 21,593,000 tons (7.6 per cent) behind that for the corresponding period of last year.

COMMODITY PRICES—The Bureau of Labor Statistics index of commodity prices which last week reached a new peak for this war dropped slightly in the latest week, thus registering the first decline since late February. Prices of industrial raw materials and manufactured products also eased off in the latest week.

STOCK MARKET—On the stock market there has been an upward trend highlighted by the railroads. Technicians are watching the industrials closely because the average, in their opinion, has to go into new high ground to confirm the railroad advance if the general market is going to reach the highs which some experts are predicting for this summer.

WAR EXPENDITURES—War expenditures in the latest week, down $200 million from the prior week, were at the lowest rate registered since V-E Day. Cutbacks in military procurement since May 1 total $8.5 billion.



Construction Valuation In 37 States
(Unit—$1,000,000)

	Total		Public Works-Utilities			Residential and Non-Residential		
	1945	1944	1945	1944	1943	1945	1944	1943
January	140.9	159.2	39.8	50.3	85.8	101.2	108.9	264.5
February	147.0	137.2	32.0	55.1	112.9	115.0	82.1	280.5
March	328.9	176.4	90.6	61.3	123.0	238.3	115.1	216.3
April	395.8	179.3	111.9	72.0	127.7	283.9	107.3	175.4
May	242.5	144.2	107.9	55.8	95.8	134.6	88.4	138.4
June	....	163.9	....	70.7	73.8	....	93.1	156.8
July	....	190.5	....	80.5	50.0	....	110.0	133.4
August	....	169.3	....	69.4	73.4	....	99.9	340.8
September	....	175.7	....	64.1	175.1	....	111.6	125.4
October	....	144.8	....	52.2	63.5	....	92.6	150.4
November	....	164.9	....	48.0	59.0	....	116.9	125.4
December	....	188.5	....	66.6	67.4	....	121.8	184.0
Total	....	1,993.9	....	746.0	1,106.9	....	1,247.2	2,106.6

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	88	90.0	93.5	98
Electric Power Distributed (million kilowatt hours)	4,348	4,327	4,377	4,287
Bituminous Coal Production (daily av.—1000 tons)	1,996	1,861	1,785	2,059
Petroleum Production (daily av.—1000 bbls.)	4,888	4,853	4,867	4,568
Construction Volume (ENR—unit $1,000,000)	$59.2	$43.0	$29.0	$29.2
Automobile and Truck Output (Ward's—number units)	19,600	19,580	21,260	18,985

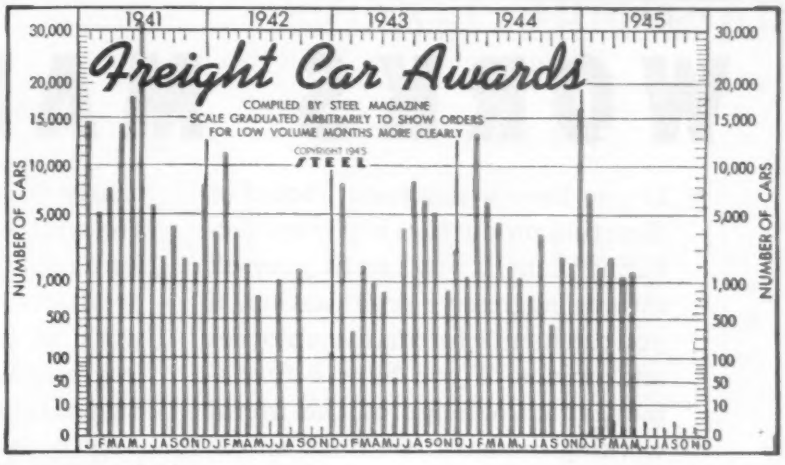
*Dates on request.

TRADE				
Freight Carloadings (unit—1000 cars)	893†	884	869	879
Business Failures (Dun & Bradstreet, number)	13	12	15	30
Money in Circulation (in millions of dollars)‡	$26,533	$26,513	$26,372	$22,333
Department Store Sales (change from like week a year ago)‡	+4%	+9%	+5%	+7%

†Preliminary. ‡Federal Reserve Board.

Freight Car Awards

	1945	1944	1943	1942
Jan.	7,200	1,020	8,365	4,253
Feb.	1,750	13,240	350	11,725
March	2,500	6,510	1,935	4,080
April	1,120	4,519	1,000	2,125
May	1,526	1,952	870	822
June		1,150	50	0
July		795	4,190	1,025
Aug.		3,900	8,747	0
Sept.		400	6,820	1,863
Oct.		2,425	5,258	0
Nov.		1,065	870	0
Dec.		16,245	2,919	135
Total		53,221	41,355	26,028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1942
1943
1944
1945
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20,000
15,000
10,000
5,000
1,000
500
100
50
10
0
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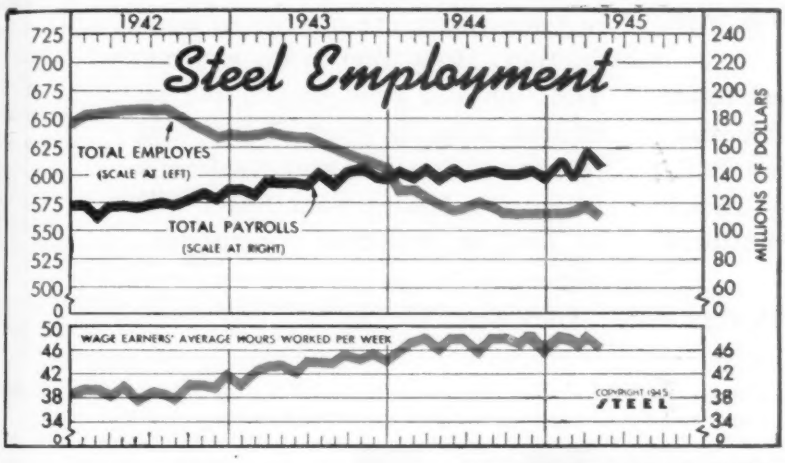


Steel Employment

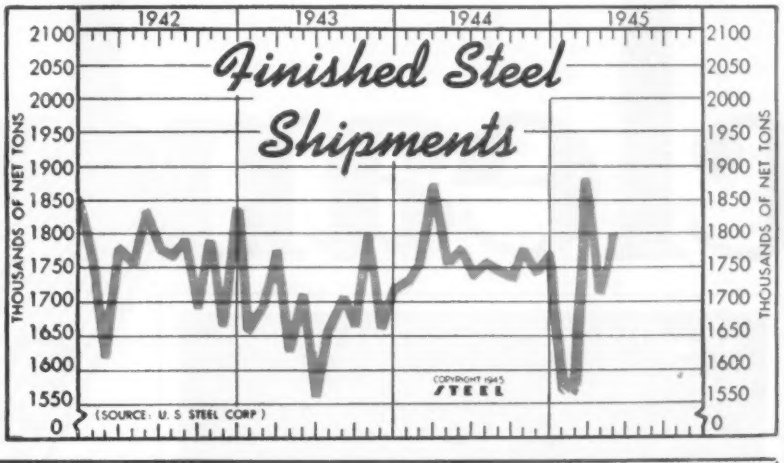
	Employes (000 omitted)			Total Payrolls (Unit—$1,000,000)		
	1945	1944†	1943	1945	1944	1943
Jan.	564	583	637	$150.3	$141.8	$129.7
Feb.	566	583	635	138.4	137.6	122.8
March	570	578	637	155.0	145.3	136.8
April	567	573	634	147.0	138.9	133.3
May		569	632		145.4	137.4
June		570	631		140.5	136.2
July		571	627		141.7	142.8
Aug.		569	625		143.9	139.9
Sept.		565	620		142.2	143.8
Oct.		564	615		147.7	144.9
Nov.		564	611		143.1	141.5
Dec.		564	605		139.9	140.2

†Monthly average; previous reports showed total number regardless of whether they worked one day or full month.

U. S. Steel Corp.'s Finished Steel Shipments
(Net Tons)

	1945	1944	1943	1942
Jan.	1,569,115	1,730,787	1,658,992	1,738,893
Feb.	1,562,488	1,755,772	1,691,592	1,616,587
Mar.	1,869,642	1,874,795	1,772,397	1,780,938
Apr.	1,722,845	1,756,797	1,630,828	1,758,894
May	1,797,987	1,776,934	1,706,543	1,834,127
June		1,737,769	1,552,662	1,774,068
July		1,754,525	1,660,762	1,765,749
Aug.		1,743,485	1,704,289	1,788,650
Sept.		1,733,602	1,664,577	1,703,570
Oct.		1,774,969	1,794,968	1,787,501
Nov.		1,743,753	1,660,594	1,665,545
Dec.		1,767,600	1,719,624	1,849,635
Total		21,150,788	20,244,830	21,064,157
Adjustment			*97,214	*449,020
Total			20,147,616	20,615,137

*Decrease.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$10,847	$11,582	$11,025	$9,081
Federal Gross Debt (billions)	$242.8	$241.5	$237.3	$189.2
Bond Volume, NYSE (millions)	$60.5	$44.1	$52.2	$55.8
Stocks Sales, NYSE (thousands)	9,254	8,234	6,724	5,943
Loans and Investments (billions)†	$58.3	$57.5	$57.0	$50.0
United States Gov't Obligations Held (millions)†	$43,296	$42,842	$42,748	$37,027

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$58.27	$58.27	$57.55	$56.73
All Commodities†	106.0	106.1	105.7	104.0
Industrial Raw Materials†	118.8	118.9	117.9	114.4
Manufactured Products†	102.0	102.1	102.0	101.0

†Bureau of Labor's Index, 1926 = 100.

WORKS MANAGER

If you have a successful record of directing production in a manufacturing plant, if you can fit yourself into an aggressive organization, if you can handle foreman, employees and unions, if you have a fundamental knowledge of the metal working industry, we have an exceptional opportunity for you, with liberal compensation.

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See Tight Civilian Steel Situation in Third Quarter

Leaders point to heavy commitments for war . . . Restrictions off July 1 on reinforcing and plates . . . Scrap prices back at ceiling

MUCH doubt is expressed by steel leaders over recent reports that substantial tonnages of unrated steel will be available third quarter. They doubt seriously if there will be anywhere near enough steel to meet recently announced quotas such civilian products as mechanical refrigerators, washing machines and electric stoves, even though priority assistance given.

Estimates of unrated steel available in third quarter have as high as a million tons, last week a WPB spokesman being quoted as stating "free" steel for the third quarter would be double the amount previously expected—1,000,000 tons instead 500,000. Producers, however, assert that from a practical standpoint nowhere near this quantity can be expected. They point out that if demand were heavy for plates and reinforcing steel and certain other items and if raw steel could be spared meet such a demand "free" steel might be reasonably heavy, but such prospect appears out of the question.

Present outlook is for some third quarter unrated steel in plates, reinforcing bars, some wire products, alloy and perhaps carbon bars in smaller sizes. There may even be a fair tonnage plain heavy gage sheets, particularly 9 and 11-gage, as a result of substantial reductions in landing mats. However, this tonnage can not be readily applied to automobiles and other civilian products. Producers see no source for an appreciable quantity of light sheets for some time. Automobile builders, however, may be able to develop excess steel in gages and finishes they need, in sufficient quantity to help a little in third quarter.

Even where priorities are available, as in the case of certain household appliances, producers of steel believe there will be congestion of orders. Hot-rolled pickled sheet schedules are far extended, with pickling facilities a choke-point and this situation is causing increasing pressure on cold-rolled sheets, from the armed forces. In spite of the fact that steel for household appliance programs was taken into account when allotments were made to the claimant agencies a month or more ago, military needs for sheets for nearby delivery have been so heavy that many in the trade believe civilian programs will have a hard road in third quarter.

Meanwhile restrictions are being further eased on some products which are in tapering demand, with production directives to be lifted July 1 on plates, reinforcing bars and mesh and some wire items, including fence and barbed wire. The plan appears to continue releases of this kind as opportunity offers.

Estimated national steelmaking rate last week regained 2 points to 90 per cent of capacity, mainly due to easing in strikes which had carried the rate down for the preceding fortnight. Pittsburgh regained 4 points to 89 per cent, Birmingham 29 points to 65 per cent, Wheeling 4 points to 90½, Detroit 9 points to 75, from a revised rate of 66 the prior week and Chicago ½-point to 95½. Cincinnati lost 5 points to 55 per cent, Youngstown 1 point to 90, Cleveland 1½ points to 91½ and eastern Pennsylvania 1 point to 90. Rates were unchanged as follows: St. Louis 75, New England 86 and Buffalo 90½.

Scrap dealers and melters hold a conservative attitude, avoiding accumulation in view of uncertainties. At the same time stocks have been allowed to run low and some rebuilding is under way. Prices on all grades except borings and turnings are at ceiling and the latter are stronger. Weakness in the East has disappeared and prices on steelmaking scrap there are at ceilings again.

Pig iron supply continues sufficient for needs, though the situation is fairly tight, with no inventories by producers or melters.

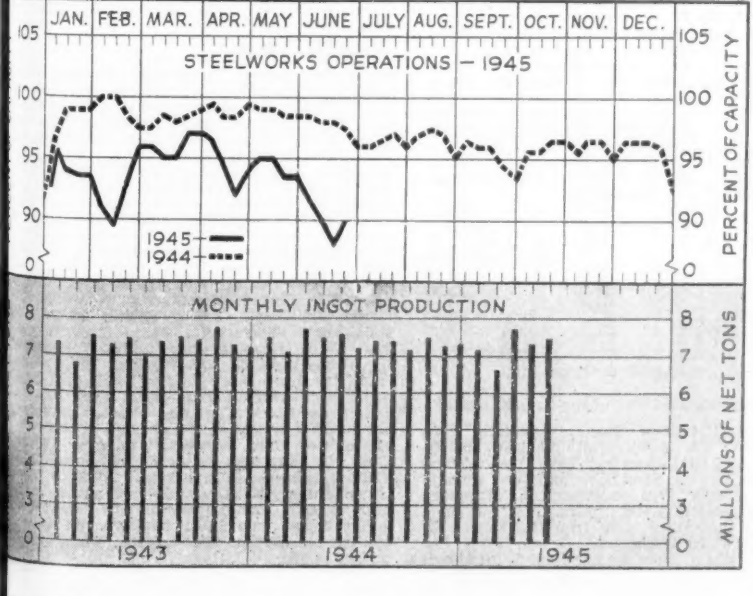
Average composite prices of steel and iron products are all at ceiling prices, steelmaking scrap having regained the loss occasioned a few weeks ago, now standing at $19.17. Finished steel composite is $58.27, semifinished steel at $37.80 and steelmaking pig iron $24.05.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended June 23	Change	Same Week 1944	Same Week 1943
Pittsburgh	89	+4	92	98
Chicago	95.5	+0.5	100.5	98
Eastern Pa.	90	—1	94	93
Youngstown	90	—1	96	97
Wheeling	90.5	+4	95.5	86.5
Cleveland	91.5	—1.5	90.5	94
Buffalo	90.5	None	90.5	90.5
Birmingham	65	+39	95	100
New England	86	None	85	95
Cincinnati	55	—5	76	95
St. Louis	75	None	79.5	95
Detroit	75	+9	83	92
Estimated national rate	90	+2	*97.5	*98.5

*Based on steelmaking capacities as of these dates.



COMPOSITE MARKET AVERAGES

	June 23	June 16	June 9	One Month Ago May, 1945	Three Months Ago Mar., 1945	One Year Ago June, 1944	Five Years Ago June, 1940
Finished Steel	$58.27	$58.27	$58.27	$57.73	$57.55	$56.73	$56.73
Semifinished Steel	37.80	37.80	37.80	36.45	36.00	36.00	36.00
Steelmaking Pig Iron	24.05	24.05	24.05	24.05	23.55	23.05	22.05
Steelmaking Scrap	19.17	19.00	19.00	19.13	19.17	19.17	19.13

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	June 23, 1945	May, 1945	Mar., 1945	June, 1944
Steel bars, Pittsburgh	2.25c	2.17c	2.15c	2.15c
Steel bars, Chicago	2.25	2.17	2.15	2.15
Steel bars, Philadelphia	2.57	2.49	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.25	2.22	2.20	2.10
Plates, Philadelphia	2.30	2.26	2.25	2.15
Plates, Chicago	2.25	2.22	2.20	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.65	3.65	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.65	3.65	3.50
Bright bess., basic wire, Pittsburgh	2.75	2.64	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.90	2.82	2.80	2.55

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$36.00	$34.50	$34.00	$34.00
Slabs, Pittsburgh, Chicago	36.00	34.50	34.00	34.00
Rerolling billets, Pittsburgh	36.00	34.50	34.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts	2.15	2.05	2.00	2.00

Pig Iron	June 23, 1945	May, 1945	Mar., 1945	June, 1944
Bessemer, del. Pittsburgh	$26.19	$26.19	$26.19	$25.19
Basic, Valley	24.50	24.50	24.50	23.50
Basic, eastern del. Philadelphia	26.34	26.34	26.34	25.34
No. 2 fdry., del. Pitts., N.&S. Sides	25.69	25.69	25.69	24.69
No. 2 foundry, Chicago	25.00	25.00	25.00	24.00
Southern No. 2, Birmingham	21.38	21.38	21.38	20.38
Southern No. 2 del. Cincinnati	25.30	25.30	25.30	24.30
No. 2 fdry., del. Phila.	26.34	26.34	26.34	25.34
Malleable, Valley	25.00	25.00	25.00	24.00
Malleable, Chicago	25.00	25.00	25.00	24.00
Lake Sup., charcoal, del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.19	25.19	25.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33	140.33

Scrap				
Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke				
Connellsville, furnace, ovens	$7.50	$7.00	$7.00	$7.00
Connellsville, foundry ovens	8.25	7.75	7.75	7.75
Chicago, by-product fdry., del.	13.35	13.35	13.35	13.35

STEEL, IRON RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and May 21, 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill Kaiser Co. Inc., $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop., $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bll) $38; Pac. Ports, (bll) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42. Detroit, del. $44; Duluth, billets, $44; forg. bil. f.o.b. Pac. ports, $54.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles).

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54; del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—$\frac{9}{32}$ in. inclusive, per 100 lbs., $2.15. Do., over $\frac{9}{32}$—$\frac{47}{64}$-in., incl., $2.30; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific ports $0.50. (Pittsburgh Steel Co., $0.20 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3": Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Mahoning Valley 2.32½c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c. (Calumet Steel Division, Borg-Warner Corp., and Joslyn Mfg. & Supply Co. may quote 2.35c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.80c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.70
		(.20-.30 Mo)	0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70c; Toledo 2.80c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City. New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00c, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.70c; Granite City, base 3.80c; New York del. 3.94c; Phila. del 3.87c; Pacific ports 4.25c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.36c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 2.85c; Granite City, base 2.95c; Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; 20-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrica	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	.....
65	7.25c	8.00c	.....
58	7.75c	8.50c	.....
52	8.55c	9.30c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export; Sheffield Steel Corp., 2.55c f.o.b. St. Louis. Geneva Steel Co., 3.25c, Pac. ports); Kaiser Co. Inc., 3.20c f.o.b. Los Angeles).

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth).

Bright basic, bessemer wire	2.75c
Spring wire	3.35c

(Pittsburgh Steel Co., 0.20c higher.)

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.90; galvanized, $2.55; Pac. ports ..... $3.40 and $3.05

Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.20c

Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.55c

Woven fence, 15½ gage and heavier, per base column ..... .67c

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates, $46 net ton, base, Standard spikes, 3.25c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung.	Chr.	Van.	Moly.	Pitts. base per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
.....	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL

403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F.	19.50	22.50	29.50	18.75	24.50
440A.	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

STAINLESS CLAD STEEL (20%)

304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices, wasters 75%, waste-wasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅞ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-inch and less	62	64
½-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ⅛-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75

By-Product Foundry

Kearney, N. J., ovens	12.65
Chicago, outside delivered	12.60
Chicago, delivered	13.38
Terre Haute, delivered	13.10
Milwaukee, ovens	13.38
New England, delivered	14.25
St. Louis, delivered	†13.30
Birmingham, delivered	10.50
Indianapolis, delivered	13.10
Cincinnati, delivered	12.85
Cleveland, delivered	12.80
Buffalo, delivered	13.00
Detroit, delivered	13.36
Philadelphia, delivered	12.88

*Operators of hand-drawn ovens using trucked coal may charge $8.00, effective May 26, 1945. †13.85 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha	15.00c
Pure and 90% benzol	28.00c
Toluol, two degree	27.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do., tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.144[11]	4.715	6.012[23]	6.012[23]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.103[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.103[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[15]	4.872[25]	4.072[21]	4.772	5.816[23]	5.860[23]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.052[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[20]	4.041[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.165[21]	.....	.....	.....
Bethlehem, Pa.*	..	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[10]	3.75[21]	4.669	5.60[23]	5.75[23]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[15]	4.30[10]	3.65[21]	4.35	5.60[23]	5.75[23]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[15]	4.40[24]	3.75[21]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[12]	4.30[24]	3.65[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[13]	4.40[24]	3.75[21]	4.45[21]	5.60[23]	5.65[23]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.65[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[12]	4.500[24]	3.800[21]	4.659	5.93[23]	5.93[23]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[19]	5.443[24]	4.443[13]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[19]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	6.391[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[12]	4.475[24]	4.011[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[12]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[16]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.75[21]	4.65	5.75[23]	5.85[23]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[24]	3.887[21]	4.787	5.987[23]	6.087[23]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	3.98[21]	4.78	6.08[23]	6.18[23]
St. Paul	3.76[3]	3.81[3]	3.81[3]	5.41[3]	3.51[3]	3.86[3]	3.86[3]	5.257[15]	4.46[24]	4.361[21]	5.102	6.09[23]	6.19[23]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[1]	5.172[15]	4.347[24]	4.031[21]	4.931	6.131[23]	6.231[23]
Memphis, Tenn.	4.015[5]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[15]	4.78[24]	4.33[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.903[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.852[24]	4.54	5.215	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[26]	5.079[10]	4.60[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.763[3]	4.313[3]	4.313[3]	5.313[26]	4.10[10]	3.65[23]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6.00[12]	7.20[6]	5.583[23]	5.613	5.85[23]	5.95[23]
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[15]	7.30[15]	5.333[21]	7.333	8.304[23]	8.404[23]
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.30[27]	5.75[15]	6.60[15]	5.533[16]	.....	.....	.....
Tacoma	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.60[15]	5.783[21]	.....	.....	8.00[23]
Seattle	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.05[15]	5.783[21]	.....	.....	8.00[23]

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 18 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton. 51½% (Natural)
Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50

Domestic (seller's nearest rail)

48% 3:1	52.80

less $7 freight allowance

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 243, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(*Extras for alloy content*)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.00
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.80	36.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.00	$25.50	$27.00	$26.50
Newark, N. J., del.	27.53	27.03	28.53	28.03
Brooklyn, N. Y., del.	28.50	.....	.....	29.00
Birdsboro, Pa., base	26.00	25.50	27.00	26.50
Birmingham, base	‡21.38	‡20.00	26.00	.....
Baltimore, del.	26.61	.....	.....	.....
Boston, del.	26.12	.....	.....	.....
Chicago, del.	25.22	.....	.....	.....
Cincinnati, del.	25.06	23.68	.....	.....
Cleveland, del.	25.12	24.24	.....	.....
Newark, N. J., del.	27.15	.....	.....	.....
Philadelphia, del.	26.46	25.96	.....	.....
St. Louis, del.	25.12	24.24	.....	.....
Buffalo, base	25.00	24.00	26.00	25.50
Boston, del.	26.50	26.00	27.50	27.00
Rochester, del.	26.53	.....	27.53	27.03
Syracuse, del.	27.08	.....	28.08	27.58
Chicago, base	25.00	24.50	25.50	25.00
Milwaukee, del.	26.10	25.60	26.60	26.10
Muskegon, Mich., del.	28.19	.....	.....	28.19
Cleveland, base	25.00	24.50	25.50	25.00
Akron, Canton, O., del.	26.39	25.89	26.89	26.39
Detroit, base	25.00	24.50	25.50	25.00
Saginaw, Mich., del.	27.31	26.81	27.81	27.31
Duluth, base	25.50	25.00	26.00	25.50
St. Paul, del.	27.63	27.13	28.13	27.63
Erie, Pa., base	25.00	24.50	26.00	25.50
Everett, Mass., base	26.00	25.50	27.00	26.50
Boston, del.	26.50	26.00	27.50	27.00
Granite City, Ill., base	25.00	24.50	25.50	25.00
St. Louis, del.	25.50	25.00	.....	25.50
Hamilton, O., base	25.00	24.50	.....	25.00
Cincinnati, del.	25.44	25.61	.....	26.11
Neville Island, Pa., base	25.00	24.50	25.50	25.00
§Pittsburgh, del. No. & So. sides	25.69	25.19	26.19	25.69
Provo, Utah, base	23.00	22.50	.....	.....
Sharpsville, Pa., base	25.00	24.50	25.50	25.00
Sparrows Point, base	26.00	25.50	.....	.....
Baltimore, del.	26.99	.....	.....	.....
Steelton, Pa., base	.....	25.50	.....	26.50
Swedeland, Pa., base	26.00	25.50	27.00	26.50
Philadelphia, del.	26.84	26.34	.....	27.34
Toledo, O., base	25.00	24.50	25.50	25.00
Youngstown, O., base	25.00	24.50	25.50	25.00
Mansfield, O., del.	26.94	26.44	27.44	26.94

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. ‡For phosphorus 0.70% or over deduct 38 cents. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)	$30.50		
6.51-7.00	$31.50	9.01- 9.50	36.50
7.01-7.50	32.50	9.51-10.00	37.50
7.51-8.00	33.50	10.01-10.50	38.50
8.01-8.50	34.50	10.51-11.00	39.50
8.51-9.00	35.50	11.01-11.50	40.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.00% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn.	$34.00
Chicago, del.	37.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$24.50
Valley base	24.50

Low Phosphorus

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$66.55

First Quality

Pa., Ill., Md., Mo., Ky.	52.85
Alabama, Georgia	52.85
New Jersey	57.70
Ohio	46.35

Second Quality

Pa., Ill., Md., Mo., Ky.	47.90
Alabama, Georgia	39.15
New Jersey	50.50
Ohio	37.10

Malleable Bung Brick

All bases	61.65

Silica Brick

Pennsylvania	52.65
Joliet, E. Chicago	60.65
Birmingham, Ala.	52.85

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	31.95
Wire cut	29.90

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net ton, carloads CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. (After Aug. 29 base price any grade $30.) war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, $135; add $6 for packed c.l., $10 for ton, $13.50 less-ton, f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn., where Tennessee Products Co. is seller; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is seller; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%; delivered Pittsburgh, $140.33.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central, 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R.R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome: Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65c for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom. 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium; 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed; 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western, spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max., sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract, ton lots, $1.89, less, $2.01, eastern, freight allowed; $1.903 and $2.023 central, $1.935 and $2.055 western, spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot, up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake: Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed, per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract, ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 Central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.60c, 17.35c and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c, eastern, freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 13.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c, 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 to c.l., 35c; central 34.25c and 36c; western, 34.55c and 38.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Spot, carlots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder: spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, f.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ⅛ cent higher.

Simanal: (Approx. 20% each Si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 150 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No.1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	14.75
Mixed Borings, Turnings	10.50-11.00
Machine Shop Turnings	10.50-11.00
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	17.50

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	7.00- 7.50
Mixed Borings, Turnings	7.00- 7.50
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	11.00-11.50
Short Shovel Turnings	14.00-14.50
Mixed Borings, Turnings	12.00-12.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.00-13.50
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	5.50- 6.00
Mixed Borings, Turnings	5.50- 6.00
Short Shovel Turnings	7.50- 8.50
Chemical Borings	13.81
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel, Turnings	16.00
Mach. Shop Turnings	14.00
Mixed Borings, Turnings	14.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	21.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$21.00
No. 1 Heavy Melt Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	15.00-15.50
Cast Iron Borings	14.00-14.50
Machine Shop Turnings	11.50-12.50
Low Phos. Plate	21.00-22.00

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	11.00-11.50

BIRMINGHAM:

(Delivered consumer's plant)

Billet, Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails, Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	14.25-14.75
Machine Turnings	11.00-11.50
Mix. Borings, Sht. Turn.	12.00-12.50
Short Shovel Turnings	13.00-13.50
Cast Iron Borings	12.00-12.50
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00
(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)	

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	11.00
Short Shovel Turnings	14.00
Mixed Borings, Turn.	11.00
Cast Iron Borings	13.00
Low Phos.	21.75

DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	7.00- 7.50
Short Shovel. Turnings	10.50-11.00
Cast Iron Borings	9.50-10.00
Low Phos Plate	19.32-19.82
No. 1 Cast	20.00
Heavy Breakable Cast	13.50-14.00

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	$17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	9.00
Rerolling Rails	21.00
Steel Car Axles	21.50-22.00
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25
(Cast grades f.o.b. shipping point)	
Stove Plate	18.00

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	7.50- 8.00
Shoveling Turnings	9.50-10.00
Cast Iron Borings	9.50-10.00
Mixed Borings, Turnings	8.50- 9.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Deal. Bundles	12.00
Machine Turnings	4.50
Mixed Borings, Turnings	4.00
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.50
No. 3 Bundles	9.00
Machine Turnings	6.90
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut Structural, Plate, 1", under	18.00
Alloy-free Turnings	7.50
Tin Can Bundles	14.50
No. 2 Steel Wheels	16.00
Iron, Steel Axles	23.00
No. 2 Cast Steel	15.00
Uncut Frogs, Switches	16.00
Scrap Rails	16.00
Locomotive Tires	16.00

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¼c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.40c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low-grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.), 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Prices for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American, bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224-lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: OPA ceiling prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz., $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193. Open market, spot, New York, nominal for 50 to 100 flasks; $158 to $163 in smaller quantities.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2% 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze			
90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more, plant scrap only. Segregated solids: S-type alloys (2S, 3S, 17S, 18S, 24S, 32S, 52S) 9.00c, 10.00c, 10.50c; All other high grade alloys 8.50c, 9.50c, 10.00c; low grade alloys 8.00c, 9.00c, 9.50c. Segregated borings and turnings: Wrought alloys (17S, 18S, 32S, 52S) 7.50c, 8.50c, 9.00c; all other high grade alloys 7.00c, 8.00c, 8.50c; low grade alloys 6.50c, 7.50c, 8.00c. Mixed plant scrap, all solids, 7.50c, 8.50c, 9.00c; borings and turnings 5.50c, 6.50c, 7.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ⅛-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 184

Pressure for sheets shows no abatement and needs for authorized civilian equipment pose a question where all the tonnage can be obtained for this purpose in addition to tonnage essential for the procurement agencies. Extent of cancellations for third quarter is unknown but it is doubted if they will be sufficient to provide capacity for pressing unrated tonnage for delivery in that period.

New York — Sheet sellers are still puzzled over the question as to where steel is coming from for the 227,000 mechanical refrigerators, the 155,000 washing machines and possibly 30,000 electric ranges scheduled for production in third quarter, even though priority assistance is to be provided. There is all this tonnage, to say nothing of at least a certain amount of unrated steel that should be provided automobile manufacturers if the program of 200,000 cars for civilian use is to be completed before the end of this year.

Undoubtedly part of this household equipment, which is to be given priority assistance, was contemplated when the claimant agencies were given their allotments a month or so ago. However, how much steel was actually set aside at that time has not been definitely announced. Sheet sellers believe that much more in the way of cutbacks at mill levels will have to be seen if tonnage for these appliances is to be made available.

At the moment sheet mills are expected to go into third quarter with carryover of 600,000 tons, estimated more than a month's capacity; and only short while ago, but before these late announcements with respect to thi quarter quotas on household appliance claimant agencies had approximate 150,000 tons on their hands for thi quarter requirements that they were u able to schedule, due possibly, howeve more to inability to fit the tonnage in schedules than to an actual lack overall capacity.

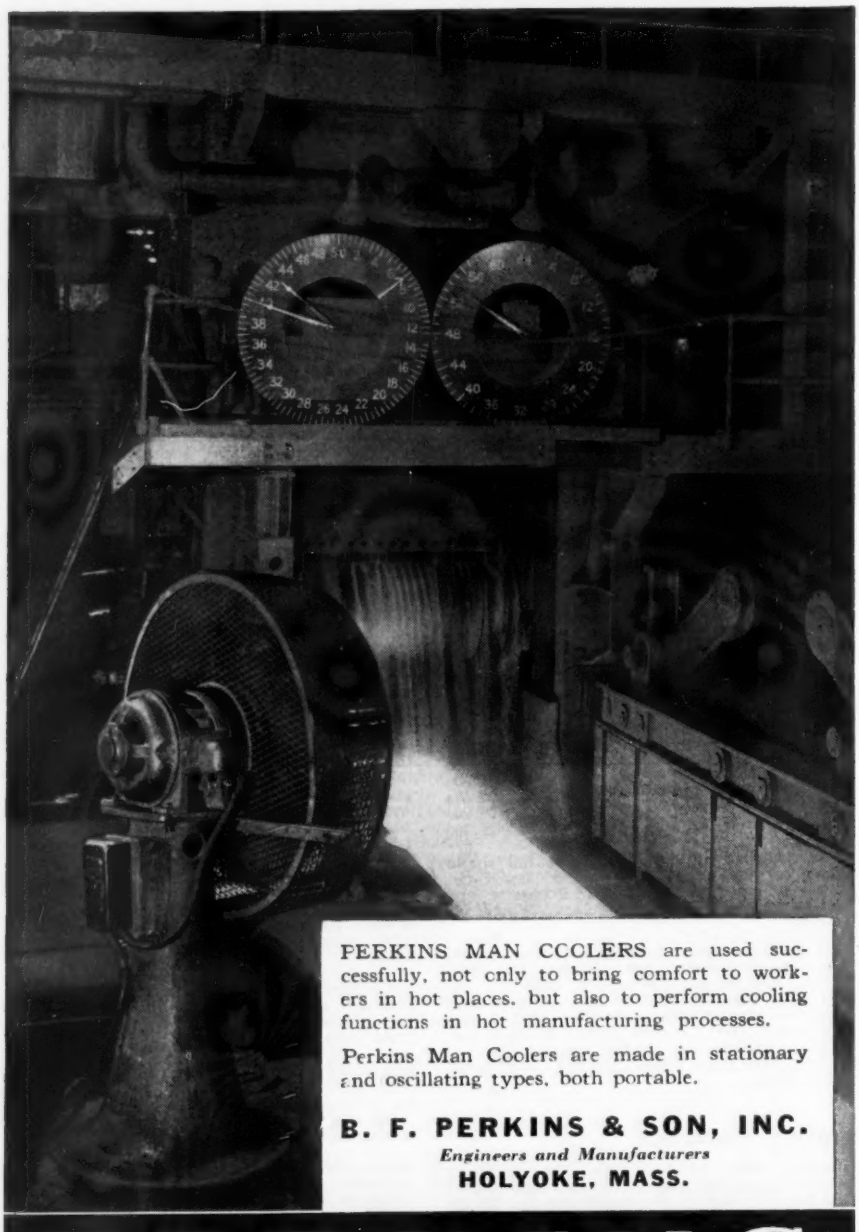
Meanwhile, hot and cold-rolled shee are being quoted for December and b yond, as far as February in some case against rated requirements. These prom ises are about the same as those of month ago; hence, there is a continue curtailment in mill backlogs on rate work. However, were unrated tonnag taken into account backlogs would b extended considerably.

Galvanized sheet deliveries fall genera ly into next year, backlogs not only bein maintained but possibly extended little because of restrictions in mi quotas which came only a short tim before controls were lifted on zinc.

Silicon sheet deliveries likewise ar holding their own, if not becoming ac tually more extended. Most producer now have little to offer before Januar in the heavier silicons and with th lighter some are reported to be booke up to the middle of next year. Stain less steel deliveries are relatively eas with most producers quoting September

Cleveland — Little easing in deliv ery of sheets and strip has developed although backlogs have receded some what on rated orders. Relatively sma tonnage has been affected by downward adjustments in war contracts, but seller expect a substantial increase in cu backs over the next 30 days. However overall order backlogs are up slightly due to the increase in unrated tonnage These unrated orders are not scheduled but some consumers, affected by contrac cutbacks, are getting priority assistanc in obtaining at least a portion of th tonnage for civilian goods production In this connection a large refrigerato manufacturer has been able to obtai over 500 tons of enameled sheets an an automotive concern is starting to ge shipment for civilian car production o sheet and bar stock originally ordere for jeep production.

Boston — Slackening validated order for narrow cold-rolled strip are accom panied by heavier inquiry for unrate tonnage; cancellations with producers which include landing mat high-carbo clip steel, are not yet in large volume Openings in September schedules ar filled by moving rated orders forwar and most mills are practically fille through October. Prospects for deliver of third quarter unvalidated volume ar dim unless cancellations increase. There are indications cancellations at mill leve still do not fully reflect cutbacks. Type writer builders and shops normally sub contracting to the automobile industr are placing some reconversion order the latter notably seeking openings. Ho strip mill July schedules will underg revisions to conform with converte needs on a replacement basis which fo next month is April. This has als brought about some heavy paper can cellations of forward tonnage. Rang builders are pressing for third quarte cold-rolled and enameling sheet tonnage An increasing number of fabricators are



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offering unrated tonnage, but validated orders for sheets are off substantially. Holyoke division, Worthington Pump & Machinery Corp., will have its first air conditioning units off assembly line in August, a new activity at that plant which has been heavily engaged in war work, notably artillery mounts and components.

Cincinnati — Sheet supply appears no easier, at least for third quarter, unless cancellations, cutbacks or shifts develop in greater volume. Mill books are choked with rated tonnage, and the overload into next quarter is substantial. Some openings for cold-rolled are in the November schedules, but backlogs for galvanized and hot-rolled extend into first quarter. Meanwhile ordering of sheets for consumer goods, delivery of which is uncertain, is unabated.

St. Louis — Sheet demand is heaviest since the beginning of the war, despite some cutbacks. Production is increasing as shift is made from plates. Sheet orders are all under CMP and deliveries on the few civilian orders that are being accepted are promised no sooner than a year. The unusual pressure is attributed to new military demand for stoves, huts and tanks and to railroad needs for freight cars. Government eagerness to to replenish railroad equipment is reflected in the fact that Madison, Ill., shops of American Car & Foundry Co. have been granted a No. 2 manpower priority.

Pittsburgh — There has been no change in sheets over the past week. Volume of incoming inquires for civilian goods production is extremely heavy, but practically none can be accepted since it has not been validated and no mill time is available under current directives for other than validated tonnage. Cancellations were characterized by one sheet sales executive as lower than normal. There have been no reports that any major sheet consuming program is slated for a change. Some interest was shown last week in announcement by Carnegie-Illinois Steel Corp. and Tennessee Coal, Iron & Railroad Co. that these United States Steel Corp. subsidiaries intended to expand substantially their facilities for production of cold reduced strip and its allied products.

Chicago — New rated orders for sheets are being received by mills in substantial volume and well in excess of cancellations, which are surprisingly light. Thus the delivery situation tightens and provides a dismal outlook for automobiles and other civilian goods this year. Nevertheless, the volume of unvalidated orders piles up. Sheetmakers decline to make delivery promises on these and are unable to put them into schedules. Consumers are trying to obtain sheets by any means and are believed to be duplicating orders in hope some producer will be able to supply. One of the district's largest consumers is reported to have purchased more sheets from warehouses than from mills in May.

Steel Bars . . .

Bar Prices, Page 184

Although demand for steel bars is easier carbon grades continue tight for several months some small sizes in carbon steel may be available for civilian use in third quarter, depending on extent of cancellations at mill level. Alloy bars may be obtainable for unrated use in third quarter on small diameters. Electric furnace alloy bars are quoted by some mills for July and August and open-hearth alloys in August and September, on unrated orders. Hot-top quality carbon bars fall in first quarter and in larger sizes as late as April.

Cleveland — Shell steel contracts on mill books remain large, with cutbacks not affecting deliveries to the extent expected as most output is in the smaller size range. The tank program is still taking large tonnages as well as aircraft engine requirements, but in both instances overall needs are substantially below former peak levels. Under Direction 70 to CMP Regulation 1, some steel consumers are obtaining deliveries for civilian use on a portion of the steel involved in their contract cutbacks. A large agricultural equipment company recently got delivery on 500 tons of bars on this basis, and a number of other concerns are expected to benefit under this CMP direction. Deliveries on hot-top quality bars remain much more extended than on plain carbon. Some easing in cold-drawn bar shipping schedules is developing, reflecting tapering in demand.

New York — While bar demand is easing, rolling schedules on carbon grades continue tight over the next several months. Some unrated tonnage may be available during third quarter, possibly in small sizes, but much depends upon the effect of cutbacks over the next few weeks. Some sellers believe there is likelihood of relatively more alloy bars being available for unvalidated orders than carbon bars. Certain mills

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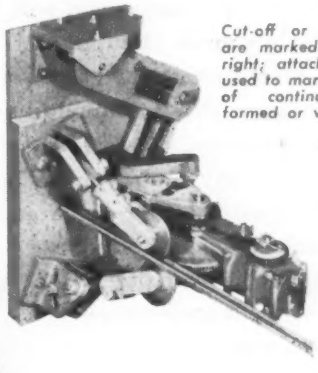

Cut-off or continuous bars are marked by machine at right; attachment at left is used to mark a wide variety of continuous extruded, formed or welded shapes.

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are quoting electric furnace alloy steel for late July and early August and are also able to supply open-hearth grades for shipment in August and September, where ratings are given.

In common carbon bars, small sizes are being quoted for September and medium and larger sizes for fourth quarter, some mills offering as early as October. Deliveries on hot-top quality bars fall generally in first quarter and in the case of the very largest rounds, in April.

Cold-drawn carbon bars are being quoted in a wide range by some mills for October and November shipment; certain other sellers, however, have little to offer before December. There has been a steady easing in delivery schedules on cold-drawn bars, but this is ascribed more to tapering of new inquiry than to cutbacks in the war program. As a matter of fact, tonnage canceled since the end of the war in Europe has been fairly negligible.

St. Louis — Demand for merchant bars is moderating somewhat under slight reduction in the shell and bomb programs. Pressure is strong, however, and orders will fill capacity to the end of the year. Cancellations are lessening but some shifts in production have been made. Civilian products manufacturers continue to place orders, despite uncertainty of delivery.

Boston — Bar cancellations continue, but in somewhat reduced volume. Ammunition components, including fuzes, take less tonnage, and cancellations are affecting nearby schedules to a greater degree, one for 2000 tons for fragmentation bombs, scheduled for June. From a peak of 90,000 a month, Garand rifle production at Springfield armory, will go to 5000 from July on; this has lopped off considerable alloy barrel blank volume. Production of a new rifle, T20, has started, with first orders for several thousand likely to be increased. Assembly of Garands is halting June 30 by Winchester Repeating Arms Co., New Haven. At least six clock and watchmakers are stopping bomb fuze production.

Forge shops continue active, but most, including one producing for aircraft, are specifying slightly less steel. Allotments have been reduced in some cases; chain requirements are smaller, but downward revisions involving steel are not as sharp as those affecting wrought iron. Volume of rated orders is lower with unrated inquiry increasing. Pressure is strongest from forge shops and others ordinarily supplying automotive parts.

Some unrated hot-rolled alloy bar tonnage will be available in third quarter, but probably little cold-drawn in either electric furnace or open-hearth grades. Extensions in delivery schedules on hot and cold-drawn carbon have halted on more sizes and in several instances have improved a month to six weeks, although the rate and extent of such improvement varies widely among mills. Continued improvement in some hot carbon deliveries, which have shortened to August on eight and 10-inch units in one instance at Buffalo, might mean some unrated tonnage available in third quarter, but there is less chance for cold-drawn unless cancellations cut deeper into backlogs of rated orders.

Chicago — Although requirements for shell steel are less than had been anticipated earlier, rated orders for quality bars from all sources have more than offset the cutbacks. Demand for bars will continue strong, as numerous war contractors suffering cutbacks or completing obligations, will take up slack in increasing production of essential goods utilizing bars. An example is farm implements, which already are running behind schedule.

Steel Plates ...

Plate Prices, Page 185

With plate inquiry quiet sheared plates are difficult to obtain before August, while some universal deliveries are promised for July. Under present indications it seems likely that any unrated tonnage delivered in third quarter probably will not be available before September. Floor plates may be available in third quarter from several mills. Under easier conditions plate users tend to return to prewar normal sources of supply after dislocations caused by war conditions.

New York — Sellers of sheared plates have nothing available before August and some claim they no longer can promise definite deliveries in that month. All of this tends to bear out recent trade predictions that whatever unrated tonnage is booked in third quarter will be principally for delivery in September. Interestingly, relatively little unrated tonnage has been sought so far. Universal plates are in much easier supply than sheared, with July shipments being promised. In this case there should be free tonnage for shipment as early as August on the basis of present indications. Plate

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inquiry in general remains fairly quiet.

Boston — Floor plates for third quarter delivery against unrated orders will be possible with several mills. With deliveries down to six to eight weeks, there are openings for August. Demand is gradually slackening. This reflects less active shipbuilding. Warehouse stocks in most instances are nearing normal, distributors also experiencing a decline in sales. Removal of plates from CMP regulations has not stimulated buying. At South Portland 12 vessels to carry crated aircraft, with an equal number of small tankers, will probably take that yard through the year at reduced schedules. Steel for these ships has been placed. Miscellaneous industrial demand for plates is less affected, but total volume is not heavy. This steady decline in demand and easing on mills is accompanied by a tendency to return to normal sources of supply.

Chicago — Plate load continues to lessen and some mills plan shorter schedules starting in July. It is reported that WPB is suspending production directives after July 1, apparently in the belief that control after that time will not be required. Reinforcing bars are said to be in a similar category, thus lending support to the possibility that controls on individual products will be removed as rapidly as demand situations warrant.

Tubular Goods . . .

Tubular Goods Prices, Page 185

Washington — Ceiling prices on cast iron soil pipe and fittings have been increased $5 per ton at the foundry level, effective June 14, OPA announces. The increase, which represents a rise of about 7½ per cent over prior ceilings, was granted to meet cost increase resulting from a five-cents-per-hour wage increase and from raw materials cost rise. Prices continue on a Birmingham, Ala., base.

Seattle — Cast iron pipe sellers state that on current business under negotiation time of delivery is the controlling element rather than price. A large backlog will be up for bids when municipalities can arrange financing and deliveries are more definite. Seattle has awarded three local improvements.

Wire . . .

Wire Prices, Page 185

New York — Contributing to slight easing in some fine wire schedules and consequently more temporary openings, are additional cutbacks in field and assault wire, lend-lease, narrow flat material, signal corps and other scattered cancellations, although fabricators are still slow to withdraw orders following cutbacks in their own contracts. Signal wire in the 0.013 range has been halved; some mills have halted production and others cut back 50 per cent. This opens some space for galvanized rope wire.

Boston — Rated orders this month are off an average of 20 per cent, but inquiry for unvalidated tonnage is well in excess of cancellations and lower firm bookings. There are scattered openings and slight easing of pressure in certain fine sizes. Openings are filled by moving CMP tonnage forward and prospects for any substantial unrated volume in fine wires for third quarter delivery without priority assistance continue uncertain. However, some priority assistance has made possible limited tonnage for the automotive industry, although with possibly one exception, pressure from automobile builders has not been excessively heavy.

Tin Plate . . .

Tin Plate Prices, Page 185

Pittsburgh — Increasing demand for tin mill products has been evident for some time and relaxation of controls has brought a flood of inquiries, substantiating earlier estimates on the volume of tin plate and black plate which will be needed. It seems obvious that existing capacity will be inadequate to serve this need and this stand is confirmed by action of United States Steel Corp. subsidiaries in announcing a substantial increase in capacity to produce cold-reduced strip for tinning.

Chicago—Tin plate makers experience more trouble in getting box cars to handle shipments. Principal difficulty is heavy grain movement, railroads diverting as many box cars as possible to this purpose. WPB is pressing for manufacture and delivery of tin plate up to the recently increased production directives.

Structural Shapes . . .

Structural Shape Prices, Page 185

Boston — Bridge inquiries are more numerous, but with few exceptions structural steel requirements are minor; high-level bridge over Annisquam river, Gloucester, is largest project on the Massachusetts program, with survey com-

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plete. Several expansions in the paper mill industry are under consideration and a building for Pullman-Standard Car Mfg. Co. at Worcester, 150 tons, is up for estimates. Demand for shapes in this area is light, but mill deliveries are generally in September on most sizes.

Seattle — Industrial buyers, although needing many steel items, are still out of the market, recent awards in this area having been for government agencies. These include 2250 tons of shapes and a tonnage of plates for a steel pipe job at Tacoma, Wash. The shape award was for an industrial-type experimental hangar at Boeing Field, to be built by Mowat-Sellen, Seattle, steel being awarded to Columbia Steel Co. An award of 750 tons of shapes for the Sand Point Naval warehouse at Seattle, went to Isaacson Iron Works, Seattle, Lease & Leighland, Seattle, having the general contract.

Philadelphia — Further tightening is noted in shape schedules, one large producer jumping delivery promises from September to November within less than a week. Other producers are sold well into Septemtber and the general position in wide flange sections is in that month also. Strength in some cases is attributed to additional shell work, although structural requirements are increasing, including some rated tonnage for export.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 185

Chicago — The past few days have been surprisingly quiet in reinforcing steel. Practically no new inquiry of importance has come out, and action has not been forthcoming on several jobs on which bids are in. It is understood WPB will remove control over reinforcing bars as of July 1 by eliminating production directives. This does not mean, of course, that output of reinforcing bars will be unlimited; pressure for steel for other products will limit steel to roll into reinforcing.

Pittsburgh — New business is developing well, with a substantial tonnage coming from new automotive plants. The shift which took steel reinforcing from the list of CMP products has not yet begun to have its effect. New billet steel producers have found that the change will put reinforcing bars at the mercy of merchant bar orders, in that validated merchant bar tonnage must be taken care of first. However, indications are that merchant bar tonnage will decline enough to permit production of at least an equivalent tonnage of reinforcing bars.

Pig Iron . . .

Pig Iron Prices, Page 187

Pig iron supply has been sufficient for needs, though tightness has developed in some instances. Inventories are being held at no more than 30 days supply and producers are unable to build stocks. Buying for third quarter is about equal to that for the current period but July melt may be slightly less, as shutdowns for vacation are planned for that month. In some areas the labor situation has improved but is still far from easy. Most castings business continues to be for war purposes.

Cincinnati — Pig iron deliveries next month may be lighter because of foundry shutdowns for vacations. Already some major interests have announced such shutdowns for July 1 to 7. Otherwise there is nothing apparent in the near future to alter the melt drastically.

Cleveland — Pig iron supply here is adequately serving current needs, blast furnace interests have been unable to build stocks as demand in other areas is acute. Some non-integrated mills have been barely able to maintain operations at times. Unusually low bituminous coal and by-product coke stocks are a major factor in preventing blowing in of additional furnaces; excessively high operating costs is the chief cause in some instances. Foundry iron consumption continues retarded by the manpower shortage but this situation is improving, which indicates an upward trend in castings output.

Buffalo — Dealers believe some consumers may have covered for third quarter slightly beyond pig iron requirements and orders for that period are perhaps somewhat heavier than for second quarter. Some rush orders are being received as foundries find supply running short. A leading seller has shipped its first consignment of basic iron by canal for a New England buyer, with two more shipments to follow soon.

Chicago — Demand and supply of pig iron are well balanced in this area, and little overall change is anticipated. It is possible that supply in the near future will suffer more than demand because of blast furnaces going down for repairs. Currently, 38 of the district's 41 furnaces are operating; however, Inland Steel Co. has scheduled

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its No. 5 stack at Indiana Harbor to go down the last week in June for relining.

Boston — Third quarter covering in pig iron indicates a slightly heavier ratio from the Buffalo district without much change in melt. From depleted stocks at the Everett furnace, little iron beyond truck delivery range will be supplied; all basic continues to come from outside and slightly more malleable. Increased competition from integrated steel mill suppliers is possible soon. Although on a curtailed schedule, the district pipe foundry has resumed melting.

Philadelphia — Pig iron sellers expect general closing of foundries during the July 4 week for vacations and inventory. However, they look for operations at a high rate the remainder of July and expect a tight situation in both foundry and basic iron for some time.

Scrap . . .

Scrap Prices, Page 188

Scrap is quiet and strong, with sufficient supply to meet requirements. Effect of reduction in shell production has decreased output of borings and turnings, while demand has remained steady, thus strengthening prices, advances being made in some districts. Ceilings are maintained on steelmaking grades and cast, the latter being scarce.

Philadelphia — Substantial purchases by the leading eastern consumer at higher prices have resulted in a generally higher market in the Philadelphia district in all grades except cast, which has been at ceiling for a long time. Heavy melting grades and No. 2 bundles are now $18.75, delivered. Other grades show a substantial rise.

These increases are not based in all cases on consumer purchases but prices paid by dealers covering back orders are sufficient in absence of consumer buying to establish the market. These increases come at a time when there is a slight easing in steel production because of summer difficulties. However, stocks have been permitted to drop to a low point in some instances, with a substantial drain on eastern supplies by Pittsburgh consumers. Curtailment in blast furnace production because of necessary repair has put added pressure on scrap, considered likely to be a factor in the overall position of scrap for some time.

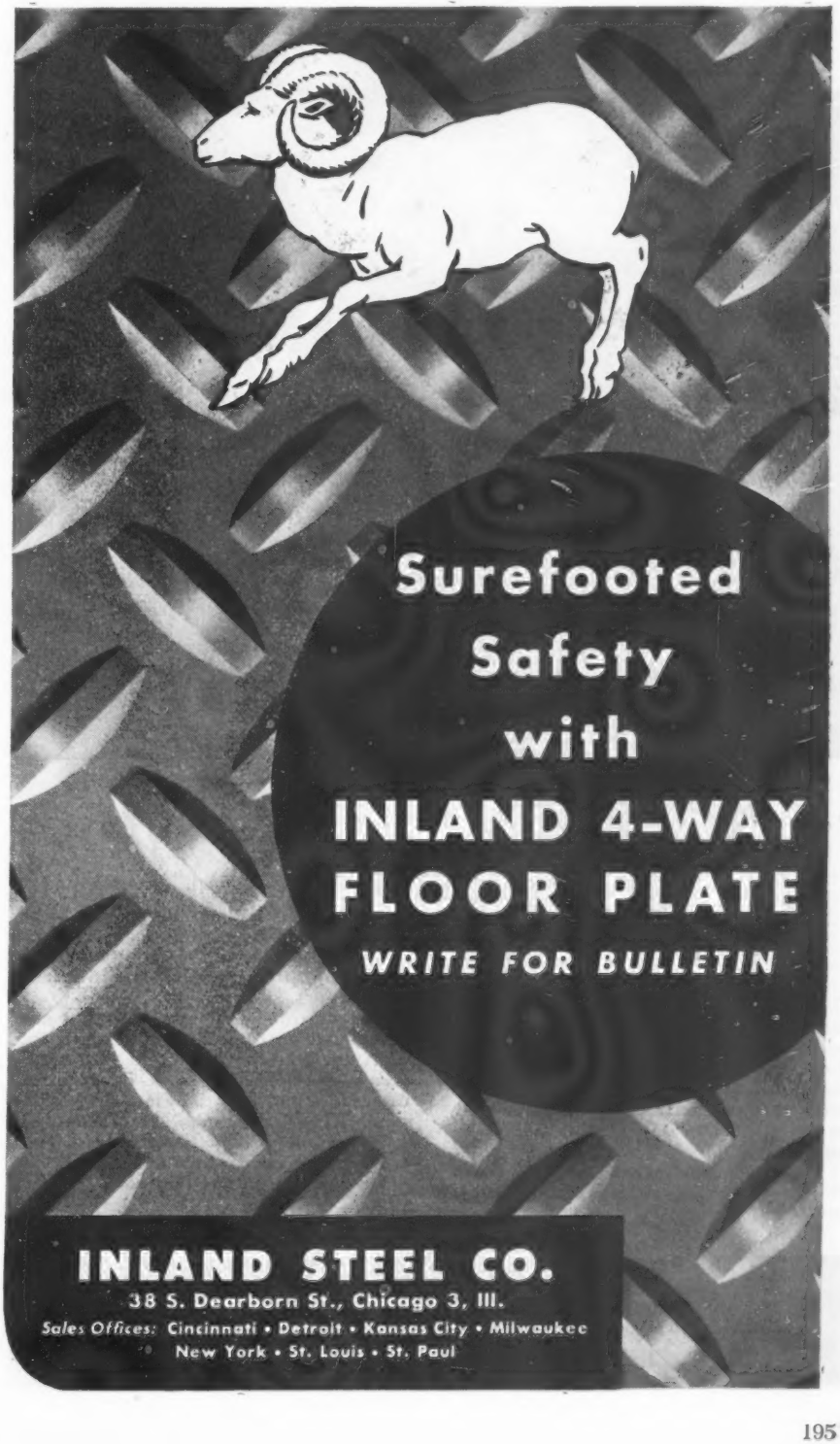
The immediate local situation is somewhat mixed. One plate mill, experiencing the general decline in plate demand, is building up cold metal stocks, following a drain last spring when pig iron was especially scarce, and is pressing for scrap. Another mill has suspended all shipments for the first week in July in anticipation of curtailed output because of vacations. Other mills may do somewhat the same. Finishing operations at some mills definitely will be down during the July 4 holiday week but to what extent melting departments will be affected is not clear.

New York — As a result of recent heavy buying by Bethlehem Steel Co., brokers' buying prices on heavy melting steel and No. 2 hydraulic bundles again are at a ceiling of $15.33 and the tone of the market generally is strong. Brokers are paying $13.33 for No. 3 bundles and $7 to $7.50 for machine turnings and mixed borings and turnings. At a recent opening on 400 tons No. 2 steel, offered by the Second Service Command, Brooklyn, five dealers bid the ceiling of $15.33, plus a 50-cent lighterage fee. The result was the service command gave each bidder 400 tons which it is understood they sold to Bethlehem Steel Co. The scrap had been brought from abroad and was the first such foreign scrap offered here in quantity for some time.

Current purchases by Bethlehem are for shipment to Bethlehem, Pa., and Sparrows Point, Md. This buyer has taken nothing for Buffalo in almost two weeks, it is said. Meanwhile there is little new buying by Pittsburgh district consumers, although substantial tonnages are moving against old contracts.

Cleveland — Open-hearth grades are firm at ceiling prices on basis of an occasional mill purchase. Supply of heavy melting steel is limited, due to tendency of dealers not to load up because of possibility of a decline. However, relatively low steel plant inventories and high consumption rate makes it unlikely that weakness in this group will develop soon. Reduction in turnings production has bolstered prices, although some steelworks currently are out of the market. Jones & Laughlin Steel Corp.'s subsidiary, Otis works, has received eight boatloads of turnings this season and more are scheduled to arrive.

Buffalo — A quiet market followed recent heavy buying but further covering is expected soon as another consumer has expressed buying interest. Another barge shipment of 4000 tons has arrived from the East. Prolonged interruption of receipts by lake has led to belief that



tonnage from the head of the lakes has been diverted to Chicago after original consignment to this area.

St. Louis — Scrap shipments are light, about 40 per cent under last month. Mills are taking some scrap but buying is moderate and limited to nearby areas. Prices generally are firm. Machine shop and short shoveling turnings have firmed unexpectedly to $9 and $10.50, respectively. Cutbacks in the shell program have cut turnings supply while demand from the Chicago district has increased. Mill reserves are six weeks or better.

Cincinnati — Absence of new buying has given a dull aspect to the iron and steel scrap market, even though the movement of material is in good volume. Perhaps the feature of the market is the conservative attitude taken by dealers and consumers which is the more pronounced because of contrast with some periods during the war years. Prices are firm, supported by heavy melt. Blast furnace and open hearths are out of production just now at Ashland, Ky., due to a strike.

Los Angeles — Collection of small lots of unclassified scrap marks a trend in dealer activities, due to greater labor supply and transportation. Buyers are ranging further afield. Price of No. 1 melting steel is firming steadily, but mixed lots of borings and turnings lag.

Chicago — Further strength in scrap is evidenced by the fact that two and possibly three district consumers within the past few days purchased machine shop turning bundles at full ceiling of $18.75, placing this item along with other heavy melting grades at ceiling. For several weeks, sales have been made at various figures between $16.75 and $18.50. Loose machine shop turnings are stronger as indicated by a spread narrowed from $1 to 50 cents. The range is now $11 to $11.50. Whereas it has been believed war cutbacks were reducing volume of turnings, it is now found higher price levels are bringing out tonnage. Scrap purchases of mills are geared close to consumption in an effort merely to hold inventory position.

Pittsburgh — Local markets took on a stronger tone last week and full ceiling prices, plus springboards, are being paid by brokers for practically all mills in this district. New purchases last week were reported from a number of mills and virtually all grades of steel were included. There is still a lag in demand for machine shop turnings and the chief shortage continues in cast grades.

Boston — Temporarily, at least, pressure on heavy melting steel prices has eased with prices at ceiling, including port differentials for No. 2 bundles and busheling, also. Lighter grades of industrial scrap, borings and turnings, have not fully recovered. The Worcester steel producer is paying $15.05, Boston differential, for No. 1 heavy melting, having first met Pittsburgh district bids of $14.73 port, first partial recovery from elimination of the 99 cent Boston differential. Supply of heavy melting steel is slightly better. Small lots of ship scrap are still allocated.

Warehouse . . .

Warehouse Prices, Page 186

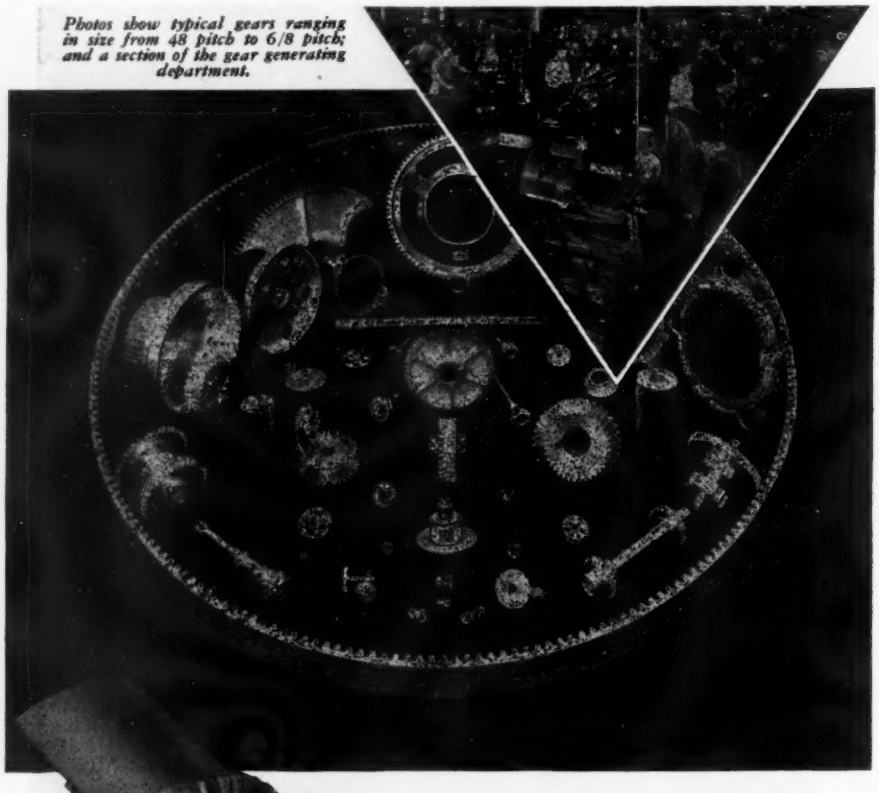
Boston — Buying from stock is maintained with only slight, spotty slackening. Replacements in scattered instances are slightly improved, although reduction in sheet mill schedules in lead time from 45 to 30 days makes for confusion. Plate tonnage from excess mill inventory is offered for delivery after July 1. Policy as to acceptance of unrated orders by warehouse is mixed. Several will handle this volume and hope for further easing on mills for openings. Most others are likely to follow this line to some degree.

New York—Unrated orders will be accepted after July 1 by some warehouses, so advising customers; others will discourage tonnage in this category, seeing slight hope for replacements at an early date from mills. The first group apparently expects cancellations and revisions in mill schedules will make openings by which unrated tonnage will be replaced before inventories are too far depleted. Thus far, while increasing, volume of unvalidated inquiry is not heavy. Reconversion of cargo ships to troop carriers is causing a flurry in light plate demand with some. Buying of commercial grades of alloys is unabated.

Los Angeles—Steel sheets are critically short in warehouses, with pipe and galvanized shapes also scarce. Demand shows an upward trend, slowed only by lack of supplies. Merchant item sales are below average. Continued delay in deliveries on all items cuts deeply into sales.

Seattle—Jobbers find the situation slightly easier, demand having declined a trifle. This is believed due to the changed war situation but active buying is expected as soon as extensive ship repair programs get into action. Galvanized sheets are highly critical, deliveries

Photos show typical gears ranging in size from 48 pitch to 6/8 pitch; and a section of the gear generating department.



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being at about nine months. Repair yards are buying plates and shapes and hot-rolled items are moving freely. Better mill deliveries have improved stocks of shapes, bars, plates and sheets.

Philadelphia — Warehouses report maintenance of a number of orders, although tonnages average slightly smaller, with likelihood that June business will be smallest this year. While moving cautiously some leading warehouses plan to accept unrated orders for third quarter, believing they have enough tonnage due on rated orders to insure fair third quarter inventory and that there will be sufficient easing in steel to enable them to replace unrated orders with unrated mill tonnage. Such orders will be subjected to close scrutiny. Certain other jobbers have indicated they will not accept any unrated business until they can see a better prospect for replacement.

Cleveland — Turnover of steel distributors' stocks has made little change, with cutbacks having only a slight effect on overall demand. Warehouse stocks are in fair balance, with plates, structurals and small bars in adequate supply. However, inventories of steel sheets and large rounds continue to decline, forcing some distributors to turn away business. Due to present high turnover steel warehouse interests state that inability to pass on recent increase in steel prices will not hit them too hard.

Cincinnati — Demand for steel from warehouse is well sustained and stocks are adequate to cause for June another high mark in sales. Sheets are tight and inventories depleted or unbalanced. However, requirements in bars, plates and structurals are being supplied.

Chicago — Warehouses are again suffering from a strike of truck drivers, the second in less than a month. Inquiry and orderwise, the warehouse picture remains unchanged. Rated orders are heavy and filling them is subject to unbalanced and restricted inventory.

Ferroalloys . . .

Ferroalloy Prices, Page 187

New York—Following five months with shipments at possibly an all-time average peak, the movement in ferroalloys in June is expected to be off about 10 per cent. There has been some easing in alloy steel demand as a result of curtailments, especially in the aircraft program, but, according to some trade leaders, curtailment in shipments this month will be due in no small measure to vacations at various consuming plants during the first week of July. Certain consumers have now instructed suppliers to ship no further tonnage after June 30.

Meanwhile leading sellers are getting caught up on shipments. Whereas at the end of March the carry-over amounted to possibly 15 per cent of deliveries promised for that month, the amount by the end of this month will be virtually negligible. There will always be a certain amount of carry-over, sellers explain, as there are last minute requests which come in too late for actual handling under any circumstances and, too, it is not always possible to schedule crushing equipment to take care of certain products even though the orders may have come in at a fairly reasonable time. However, the over-all situation now, for the first time in quite a while, is that shipments can go forward about as rapidly as required.

Precisely how long this situation will prevail remains to be seen, for the dry season in the South usually gets under way about this time, affecting production of power. However, prospects are not as bad at this time as a year ago, because of heavy rains this spring, which will help augment the water supply for some time. Further, while some easing may develop this summer in steel production, most alloy sellers expect operations to hover between 85 and 90 per cent, with little likelihood of a drop below 85 per cent between now and the end of the war with Japan.

Nonferrous Metals . . .

Nonferrous Prices, Page 189

New York — That brass mills will reduce inventories further in July is indicated by continued restricted purchases for delivery next month. Same holds for zinc. Domestic production will be absorbed but reserves will get the benefit of more imported copper. Mills will supply more unrated tonnage next month to extent of cutbacks. However, in the Connecticut valley district shipments will be at minimum because of vacations and shutdowns, in some cases from June 30 to July 9. Cancellations in war contracts are still appearing, notably in ammunition. Ship construc-

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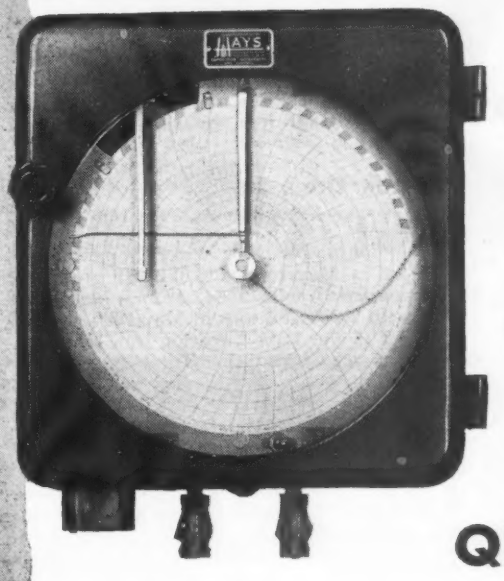

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tion requirements are also down sharply from peak. Demand for manganese bronze ingots for wheels is barely one-third that of year ago in numerous instances. All unrated orders for alloys containing tin are still subject to strict regulations under M-43. This permits use of maximum of 2 per cent tin for new uses and under certain conditions up to 5.8 per cent of tin. Controls on use of nickel are still in force and no unrated orders of any consequence can be filled for nickel silver. Volume of June unrated orders in copper and copper base products has been nil.

Total available in supply is only about two-thirds of current requirements and reserves tend downward. Military has first call on tin and remaining supplies, which are small, are allocated to maintain minimum essential civilian needs. Low-content tin solders result in high percentage of rejects frequently, requiring extra man hours and materials for reprocessing.

Heavy cuts in military requirements for brass mill products have not brought zinc requirements down to the supply level as much as expected. This is partly due to easing controls in other directions. Lead allotments for July are the smallest since March, 1944, and the stockpile may be increased by better than 10,000 tons by the end of next month.

Iron Ore . . .

Iron Ore Prices, Page 186

Consumption of Lake Superior iron ore in May totaled 6,872,461 gross tons compared with 6,641,552 in April and with 7,557,762 tons in May,1944, according to the Lake Superior Iron Ore Association, Cleveland. Total consumption for the year to June 1 was 33,949,212 tons, against 37,178,170 tons in the comparable period last year.

Ore on hand June 1 at furnaces and on Lake Erie docks totaled 20,714,738 gross tons; a month ago stocks were 16,428,765 tons and a year ago they were 21,473,619 tons. As of June 1 active blast furnaces numbered 164, compared with 168 a month earlier and 170 on June 1, 1945. Canada had seven in blast on all three dates.

Press reports that a shipment of hard iron ore from the Steep Rock mine in Canada to Cleveland consumers had been loaded at the new Port Arthur, Ont., docks is in error. Shipments of this ore all have been by rail to Superior, Wis., docks and thence by ship to the lower lake ports. The new docks are expected to be in use during July, expediting shipments by saving the rail haul to Superior.

Navy Releases Wrought Iron for Civilian Use

Navy cutbacks in orders for wrought iron have changed the recent tight situation into relatively ample supply, WPB reports. Increase in wrought iron for civilian use results from cancellations of large orders for chain. One result of the larger supply will be to ease the situation of railroads, which will be able to obtain their heavy needs for staybolts and bar iron, wrought iron being especially suited to these purposes.

Deliveries of wrought iron plates, forging billets, pipe, tubing, staybolt bars and chain iron now can be made with reasonable promptness, according

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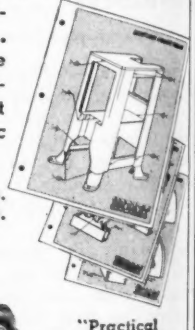
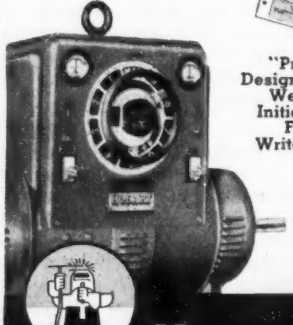
Have you thought about using more arc welding in your post-war production? More and more manufacturers see the value of arc welding for producing vital war materials . . . they know what it can do. We at Hobart value their judgment . . . not only from the standpoint of more arc welding . . . but for the type of welding equipment they will buy. They will compare all welding machines . . . feature for feature . . . and their decision will be Hobart "Simplified" Arc Welding.



HOBART BROTHERS CO.
BOX ST-653, TROY, O.



"Practical Designs for Arc Welding" Initial series FREE! Write today!

HOBART
"One of the World's Largest Builders of Arc Welders"

to G. L. Moore, chief of the wrought iron section of the steel division. Wrought iron production has averaged about 160,000 tons annually for the past three years.

Canada ....

Toronto, Ont. — Despite slowing in steel demand on war account steelmakers as a whole do not expect any sharp decline in overall demand during the transition period. Already there has been considerable slackening in Canada's war production program and this will be more pronounced over the next six weeks or two months as old contracts run out and are not renewed and some of the larger business has been canceled. A large part of United States orders placed several months ago has been either canceled or sharply reduced, and now there are indications of further reduction in war production both on Canadian and British war account. Slackening war production also has been reflected in some cancellation of steel orders, but so far these have been on a comparatively small scale. While it is a fact that demand for steel on war account has dropped well below the peak, steelmakers still report heavy backlogs and any surplus in excess of war requirements is being quickly absorbed for civilian manufacturing

Steel in Europe . . .

London — (*By Radio*) — Output of sheet mills in Great Britain has been booked solidly to the end of the year but additional tonnage is needed by plate mills to maintain full operation. Rails and steel for the coal mining industry are in active demand. Tin plate output is booked practically full to the end of September.

STRUCTURAL SHAPES ...

STRUCTURAL STEEL PLACED

14,170 tons, MZ-38 sheet piling, for Bureau of Yards and Docks, U. S. Navy, Chicago, to Carnegie-Illinois Steel Corp., Chicago.

1500 tons, industrial-type experimental hangar, Boeing Field, Seattle, to Columbia Steel Co. (Previously reported to American Bridge Co.) Mowat-Sellen, Seattle, general contractors.

750 tons, naval warehouse, Sand Point, Seattle, to Isaacson Iron Works, Seattle; Lease & Leighland, Seattle, general contractors.

700 tons; warehouse for A. M. Castle & Co., Seattle, to Bethlehem Steel Co., Seattle.

STRUCTURAL STEEL PENDING

2000 tons, Navy storehouses at Mechanicsburg, Pa.; bids June 30.

402 tons, replacement, part of Brigantine bridge, Absecon channel, Atlantic City-Brigantine, N. J.; bids July 9, Trenton; also 434 tons steel piles, 1089 linear feet wrought iron pipe sleeves; rating AA-3, allotment symbol F-6.

400 tons shapes and 430 tons H-piling for approaches to state bridge in Atlantic county, New Jersey; bids July 9.

350 tons, warehouses, Houston, Tex., and St. Louis, for Westinghouse Electric Corp.

150 tons, storage building, Pullman-Standard Car Mfg. Co., Worcester, Mass.

REINFORCING BARS . . .

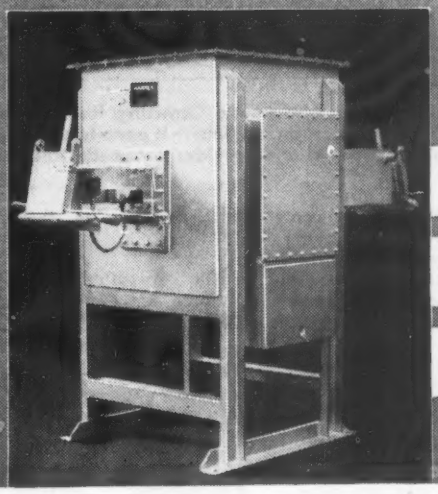
REINFORCING BARS PLACED

1600 tons, government storage building in Washington, to Bethlehem Steel Co., Bethlehem, Pa.

1400 tons, distillery warehouses at Linfield, Pa., divided equally between Bethlehem Steel Co., Bethlehem, Pa., and American Steel En-

Harper

HIGH TEMPERATURE



Electric Furnaces for

SINTERING POWDERED METALS

Temperatures up to 2750°F. Gastight construction for atmosphere control. Photograph shows entrance, high temperature and water cooled chambers with flame curtain at entrance and exit for continuous operation. Various sizes for research and mass production. Used by America's foremost concerns. Write for engineering data. Representatives in principal cities.

HARPER ELECTRIC FURNACE CORP.

1470 Buffalo Ave., Niagara Falls, N. Y. Incorporated 1924

ERIE BUCKETS

• Erie builds all types of buckets in various capacities and weights to meet the job and operating conditions. Choose the correct bucket for the job and you get maximum speed and output. Write for broadside on the complete Erie line of buckets.

THE COMPLETE LINE

ERIE STEEL CONSTRUCTION CO.

ERIE, PENNSYLVANIA

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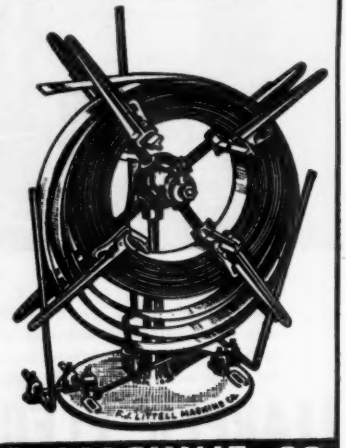
Tops on Speed in Handling Coil Stock

COIL stock, fed by LITTELL Automatic Centering Reels, insures efficient, fast, accurate, economical production. It permits continuous feeding, prevents waste of material and provides automatic roll feeding direct from coils.

LITTELL Reels automatically center coils. Ball bearing, they are easy running and insure free-moving coils for accurate feeding. Adjustable stock support holds up loose loops of coils and permits very light brake adjustment.



Plain and motor-driven types. Capacities, 300 to 6,000 lbs. Coil Cradles can be supplied for coils up to 20,000 lbs.

LITTELL also makes Roll Feeds, Dial Feeds, Feeding and Straightening Machines, Scrap Winders, Air Blast Valves, Pres-Vac Safety Feeders and Mechanical Pickers.

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Automatically Recording Blooming Mill Weights

"Doing many jobs well." That's the report on this Streeter-Amet Type B Recorder in a typical modern blooming mill. It automatically sets up a control on rolling mill production by printing the weight and heat number of each ingot as it revolves on a turntable. Weighing does not delay production. A complete heat can be printed on one ticket. The machine automatically advances the ticket for each weight. A Remote Indicator installed in the Roller's Pulpit shows the weight simultaneously with its recording by the parent machine at the turntable.

S.-A. recorders are used widely throughout industry. Write for literature.

STREETER-AMET COMPANY
4103 North Ravenswood Avenue
CHICAGO 13, ILLINOIS

STREETER-AMET

gineering Co., Philadelphia, through McCloskey & Co., Philadelphia.

365 tons, Navy air supply depot, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

350 tons, superstructure, building 41 B and C, U. S. Rubber Co., Detroit, to Truscon Steel Co., Youngstown, O., through O. W. Burke Co.

300 tons, assembly building No. 101 and boiler house, building No. 103, Dodge Truck division, Chrysler Corp., Macomb county, Michigan, to Truscon Steel Co., Youngstown, O., through Bryant & Detwiler, contractors.

REINFORCING BARS PENDING

735 tons, including 100 tons bars and 635 tons welded wire mesh, highway construction in Illinois, for State Highway Commission: Livingston and Grundy counties with 235 tons mesh, Powers-Thompson Co., Joliet, Ill., low; Livingston county with 210 tons mesh, Collignon Construction Co., Davenport, Iowa, low; Kendall county with 190 tons mesh, R. R. Anderson Co., Chicago, low; bids June 15.

500 tons, General Motors Corp. assembly plant at Wilmington, Del.; bids being taken through general contractors.

500 tons, manufacturing plant and various buildings, Chevrolet Motor Co., Flint, Mich.

230 tons, welded wire mesh, highway construction, Peoria and Stark counties, Ill., for state highway commission; general contract to Graham Paving & Construction Co., Chicago; bids June 1.

200 tons, Cadillac Motor Co., Detroit.

200 tons, invitation K-23307, bureau of reclamation, Boulder City, Nev.; bids June 22.

175 tons, expansion, E. J. Brach & Sons, Chicago.

125 tons, bridge substructure and replacement, Passaic river, Newark, and Brigantine channel, Atlantic City, N. J.; bids July 9, Trenton.

100 tons, Truck and Coach division, General Motors Corp., Pontiac, Mich.

PLATES . . .

PLATES PLACED

500 tons or more, 5421 feet of 52-inch water pipe for Tacoma, Wash., to Steel Tank & Pipe Co., Portland, Oreg.

PIPE . . .

CAST IRON PIPE PLACED

450 tons, 12-inch and under, Northampton, Mass., to United States Pipe & Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

400 tons, three local water system improvements at Seattle; general contracts awarded.

230 tons, 6 and 8-inch, Palmer, Mass.

125 tons, 6 and 8-inch, Manchester, N. H.

100 tons or more, annual requirements, Holyoke, Mass.; to Warren Pipe Co., Everett, Mass.

STEEL PIPE PLACED

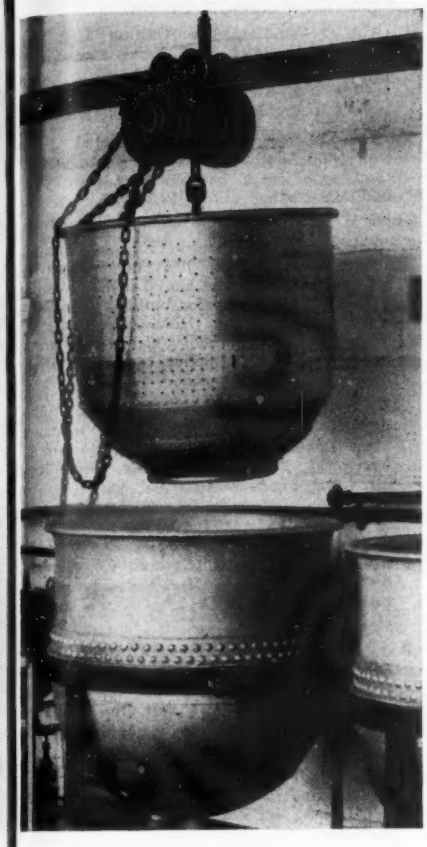
185 tons, 36-inch, Dresden, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

OPA Pricing Policy Change Urged by Small Steel Men

(*Concluded from Page* 83)

to 1944, 25 cents per hour; wage increase of approximately 9 cents an hour in production costs in 1942 due to the inauguration of time and one-half for overtime; wage increase ordered in 1944 as fringe allowances by War Labor Board which will approximate 8 cents per hour increase.

Mr. Sawhill said his company was able to offset a large part of these increases



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by improved manufacturing processes and by increased production for the war agencies, but the net result discloses a 35 per cent decline in earnings before taxes and a 65 per cent decline in earnings retained after taxes. He said on capital, equity realized was less per dollar percentagewise than the dividend rate on the preferred stock and that his company has not paid dividends on common stock during the period or prior thereto. Individual company price relief for a standard product is of no value, he declared, stating it must be granted to an industry.

CONSTRUCTION AND ENTERPRISE

INDIANA

EVANSVILLE, IND.—Moll Tool & Die Corp., 112 North Sixth avenue, has been incorporated with 1200 shares no par value to manufacture tools and dies, by Walter Moll Sr. and associates.

EVANSVILLE, IND.—Board of public works, plans postwar sewage treatment plant and interceptor sewers to cost about $6 million. Boyd E. Phelps Inc., 622½ Franklin street, Michigan City, Ind., is consulting engineer.

INDIANAPOLIS—Link-Belt Co., 220 South Belmont street, is having plans made by D. A. Bohlen & Son, 930 State Life building, for a one-story 120 x 812-foot and three-story 80 x 260-foot manufacturing plant addition, to cost about $300,000.

RICHMOND, IND.—Automotive Gear Co., South Eighth street, is having plans made for a plant addition costing $100,000 or more, with equipment.

SOUTH BEND, IND.—Federal Pipe & Supply Co. Inc., 502 East Sample street, has been incorporated with 1000 shares of $100 par value, to manufacture pipe and similar products, by Richard H. Coan, Fred G. Fechner and Richard Foohey.

TERRE HAUTE, IND.—Commercial Solvents Corp., 1331 South First street, has plans by Miller & Yeager, 200 Opera House building, and will take bids soon for a three-story 58 x 139-foot laboratory addition, to cost about $350,000.

TERRE HAUTE, IND.—Board of public works, V. R. McMillan, chairman, City Hall, plans postwar sewage treatment plant and interceptor sewers, to cost about $3 million. Metcalf & Eddy, Statler building, Boston, are consulting engineers, Thomas Hardman, Hipprodrome building, associate engineer.

MASSACHUSETTS

EVERETT, MASS.—General Steel Products Co., 48 Auburn street, Chelsea, Mass., has let contract to T. Cavanagh, 1160 Commonwealth avenue, Boston, for a one-story 65 x 150-foot plant on Second street, to cost about $40,000. S. S. Eisenberg, 69 Summer street, Boston, is architect.

GARDNER, MASS.—Simplex Time Recorder Co., 26 South Lincoln street, is having plans made by S. G. Kendall, 32 Pleasant street, for a one-story plant costing about $40,000.

SPRINGFIELD, MASS.—Standard Electric Time Co., 89 Logan street, has let contract to Ley Construction Co., 1215 Main street, for a one-story plant addition costing about $45,000.

CONNECTICUT

BRIDGEPORT, Conn.—Remington-Rand Co., 1 Main street, is having plans prepared for a four-story 60 x 200-foot factory and of-

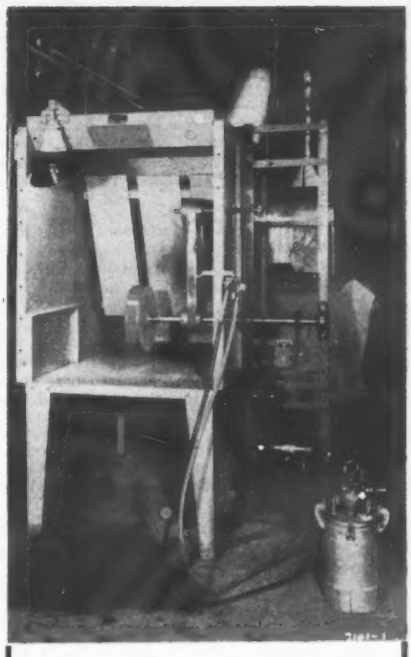

Illustration shows how either Polishing Wheels or Abrasive Coated Belts are sprayed with BRUSHING NUGLU.

SPRAYING NUGLU or NU-SPRA-GLU ON BUFFS AND POLISHING WHEELS

★

FOR SATIN OR FINISH POLISHING

★

RECOATING BELTS

★

J. J. SIEFEN CO.
DETROIT 9

fice building on Meadow street, South Norwalk, Conn., to cost about $175,000. Fletcher Thompson Inc., 211 State street, Bridgeport, is engineer.

COS COB, CONN.—New York, New Haven & Hartford railroad, E. E. Oviatt, chief engineer, Water street, New Haven, has let contract to Mertz Bros., 145 Horton avenue, Port Chester, N. Y., for a power plant and storage building, estimated to cost about $45,000.

STAMFORD, CONN.—Electronic Rubber Co., 69 Sunnyside avenue, plans a one-story 50 x 150-foot factory building and power plant. D. Mansell, 24 Park Row, is architect.

NEW YORK

DEPOSIT, N. Y.—Village plans postwar sewerage system and disposal plant to cost about $200,000. State Aid Planning Funds allotted.

HEMPSTEAD, N. Y.—Town plans postwar garbage disposal plant costing about $150,000. State Aid Planning Funds allotted.

UTICA, N. Y.—City plans postwar sewage disposal plant and sanitary sewer costing about $1,365,000. State Aid Planning Funds allotted.

PENNSYLVANIA

ALIQUIPPA, PA.—Jones & Laughlin Steel Corp., Third and Ross streets, Pittsburgh, will make plant alterations and install equipment at plant here, at cost of $25,900.

LANCASTER, PA.—Armstrong Cork Co. will let contract soon for a plant addition. W. J. Lee 1505 Race street, Philadelphia, is architect.

ROCHESTER, PA.—Pittsburgh Bridge & Iron Works, Union Bank building, Pittsburgh, will reconstruct a portion of its plant here and make alterations, at cost of $24,500.

WAYNE, PA.—Wayne Iron Works, Pembroke avenue and Lincoln Highway, has let contract for a plant building to F. H. Wilson, 125 Coulter avenue, Ardmore, Pa., to cost over $50,000. P. M. Sax, 1328 Chestnut street, Philadelphia, is architect and engineer.

OHIO

CANTON, O.—Anchor Tool & Die Inc. has been incorporated with $1000 capital by Herbert V. Ellis and associates to manufacture tools, dies and fixtures and do general machine shop work. Plant will be at 802 Second street SE, with 3600 square feet of floor space.

CLEVELAND—Harshaw Chemical Co., 1945 East Ninety-seventh street, has recevied WPB approval for construction of building 61 x 280 feet and 66 x 97 feet, at cost of about $205,000.

WARREN, O.—Copperweld Steel Co., Mahoning avenue, William S. Flee, assistant secretary, will install equipment and foundations costing $28,719.

MICHIGAN

ROSEVILLE, MICH.—Rotor Sales & Mfg. Co. Inc., Roseville Theater building, Roseville, has been incorported with $50,000 capital to manufacture vibrating machines and mechanical equipment, by Oscar H. Cartwright, 1507 Morton street, Ann Arbor, Mich.

ST. JOSEPH, MICH.—Nineteen Hundred Corp. is having plans made by Graham, Anderson, Probst & White, 80 East Jackson boulevard, Chicago, for a two-story 204 x 269-foot factory and boiler plant.

ILLINOIS

BELVIDERE, ILL.—Belvidere Distilling Co., 310 Columbia avenue, plans a feed recovery plant costing about $350,000. United Engineers & Constructors Inc., 1401 Arch street, Philadelphia, is engineer.

CHICAGO—Modern Die Casting Co., 430 East Green street, will build a one-story 65 x 120-foot plant at 4941 North Cicero avenue. S. Klefstad, 3600 West Fullerton street, is architect.

CHICAGO—Fort Wayne Corrugated Paper Co., 4500 South Kolin avenue, will let contract soon for a one and two-story plant addition costing about $150,000. A. Epstein, 2001 West Pershing Road, is engineer.

CHICAGO—Commonwealth Edison Co., 72 West Adams street, has let contract to Herlihy Mid-Continent Co., 140 South Dearborn street, Chicago, for buildings for Calumet generating plant. Holabird & Root, 333 North Michigan avenue, Chicago, are architects. Sargent & Lundy, 140 South Dearborn street, are engineers.

SAVANNA, ILL.—City, City Hall, has plans under way for postwar sewage treatment plant costing about $140,000. Howard R. Green Co., 208 Bever building, Cedar Rapids, Iowa, engineer.

MARYLAND

BALTIMORE—National Gypsum Co., Buffalo, is having plans made for postwar construction of a plant on a 15-acre site, to cost about $4 million.

BALTIMORE—Heat & Power Corp., 424 East Saratoga street, manufacturer of special welded fittings, is building a one-story addition of 5000 square feet, to handle an order for bomber parts.

RELAY, MD.—Joseph Seagram & Son, 7 State road, Louisville, Ky., has plans by Smith, Hinchman & Grylls, Marquette building, Detroit, for a boiler plant costing about $500,000.

TENNESSEE

CHATTANOOGA, TENN.—Somerville Iron Works has plans for enlargement of soil pipe plant in North Chattanooga, to cost about $250,000.

MISSOURI

INDEPENDENCE, MO. — General Motors Corp., care C. E. Wilson, president, General Motors building, Detroit, plans postwar assembly plant on 317-acre site near here.

WISCONSIN

RACINE, WIS.—E. & R. Mfg. Co., Frederick and St. Patrick streets, has let contract to P. Olson, 904 Belmont street, for one-story 60 x 170-foot and 32 x 42-foot plant additions. A. J. Seitz, 423 Main street, is architect.

SHEBOYGAN, WIS.—Polar Ware Co., Lake Shore road, has let contract to J. Houmes, 617 Erie avenue, for a two-story 24 x 130-foot shop addition. E. A. Stubenrauch, 708 Erie avenue, is architect.

IOWA

MASON CITY, IOWA—City, City Hall, has plans for postwar improvements to its sewage disposal plant, to cost about $250,000. Howard R. Green Co., 208 Bever building, Cedar Rapids, Iowa, is consulting engineer.

TEXAS

BEAUMONT, TEX.—International Derrick & Equipment Co., plans a 60 x 90-foot shop. M. R. VanValkenburgh, 6451 Main street, Houston, Tex., is engineer.

HOUSTON, TEX.—Baker Oil Tool Co., 6023 Navigation boulevard, plans a one-story tool shop addition costing about $40,000.

HOUSTON, TEX.—Basen Steel Works, 3118 Harrisburg street, has let contract to G. H. Stubblefield, Citizens State Bank building, for a storage and shop building with 300-foot conveyor, to cost about $50,000.

HOUSTON, TEX.—Davis Machine & Instrument Co., care W. E. Davis, plans one-story shop building on West Gray street,

GIBRALTAR Oil Concentrate prevents the formation of hard carbon and keeps the rings working freely. It penetrates the pores of the metal so that when the cylinder walls heat up, the oil exudes from the pores, giving instant and complete lubrication. Friction between working parts is reduced, as is motor temperature and oil consumption.

Gibraltar Oil Concentrate is setting a record of outstanding performance in air compressors and other industrial uses. Just add one part Concentrate to eight parts of regular oil.

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GIBRALTAR

HOOD REFINING CO.

253 N. HAMILTON AVENUE

GREENSBURG, PA.

38 x 70 feet. T. George McHale, 3501 Buffalo drive, is architect.

MISSION, TEX.—Border Foundry & Machine Co., Mirando City, will build a 50 x 150-foot machine shop here, costing about $40,000.

IDAHO

POCATELLO, IDAHO—Jack Simplot, owner of Simplot Fertilizer Co., plans $100,000 steel and concrete phosphate rock crushing plant. Plans are by McClelland & Jones, Seattle. (Noted May 14.)

CALIFORNIA

COMPTON, CALIF.—Best Screw Products has been formed by Herbert W. Dane and associates and is located at 1375 East Compton boulevard.

GLENDALE, CALIF.—Glendale Aircraft Supply Co. has been organized by Benedict C. DePietro and is conducting its operations at 4916 San Fernando road.

LOS ANGELES—Contractors Sheet Metal Works has been incorporated with $25,000 capital by E. S. Robinson and associates. M. E. Chapman & Associates, 124 West Fourth street, are representatives.

LOS ANGELES—H. H. Machine Products has been formed by Frank H. Havlac and has established operations at 7513 South Western avenue.

LOS ANGELES—Felbro Wire Products has been organized by Joseph W. and Oscar A. Feldner and is located at 3031 South San Pedro street.

LOS ANGELES—Allison Supply Co. has been organized by Robert D. Allison to do general machine work and manufacturing at 1829 East Randolph street.

LOS ANGELES—Los Angeles Spring & Forge Co., organized by R. C. Fuller and associates, has established its operations at 1938 South Los Angeles street.

MENTONE, CALIF.—Universal Sanitary Mfg. Co., New Castle, Pa., has let contract to P. J. Walker Co., 3900 Whiteside avenue, Los Angeles, for a plumbing and fixture manufacturing plant to cost about $500,000. Taylor & Barnes, 803 West Third street, Los Angeles, are architects and engineers.

SAN JOSE, CALIF.—International Minerals & Chemical Co., F. H. Catterson, resident manager, is having plans made for a plant for processing of sugar beet pulp residue, on a 260-acre site, to cost about $1 million.

WASHINGTON

SEATTLE—A. M. Castle & Co. have taken bids on a warehouse and office building to be erected at 3648 East Marginal Way, 140 x 460 feet, steel frame, to cost about $200,000. Two five-ton electric traveling cranes will be installed. Plans are by Naramore, Bain, Brady & Johanson.

DPC Authorizes Plant Expansion, Equipment

Defense Plant Corp. has authorized the following expansions and equipment purchases (figures are approximate):

Air Products Inc., Chattanooga, Tenn., $70,000 increase in contract for additional equipment at a plant in Chattanooga, making overall commitment $660,000.

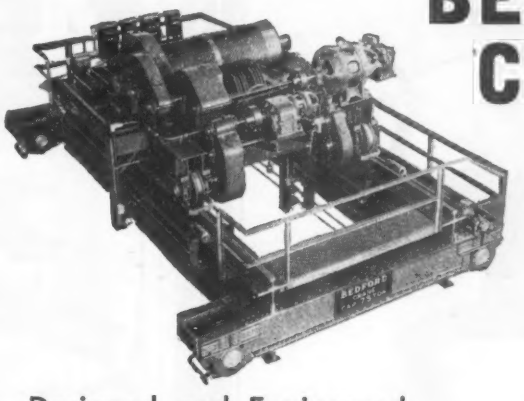
American Viscose Corp., Wilmington, Del., $1,500,000 increase in contract to provide additional equipment at a plant at Front Royal, Va., making overall commitment $8 million.

General Motors Corp., Detroit, $870,000 increase in contract to provide additional equipment at Linden and Bloomfield, N. J., making overall commitment $9,900,000.

Superior Tube Co., Philadelphia, $480,000 to provide facilities at Norristown, Pa., for production of metal tubing.

Crane Builders Since 1903

BEDFORD CRANES



Capacities:
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ANY SPAN OR LIFT

Designed and Engineered to meet Your Requirements

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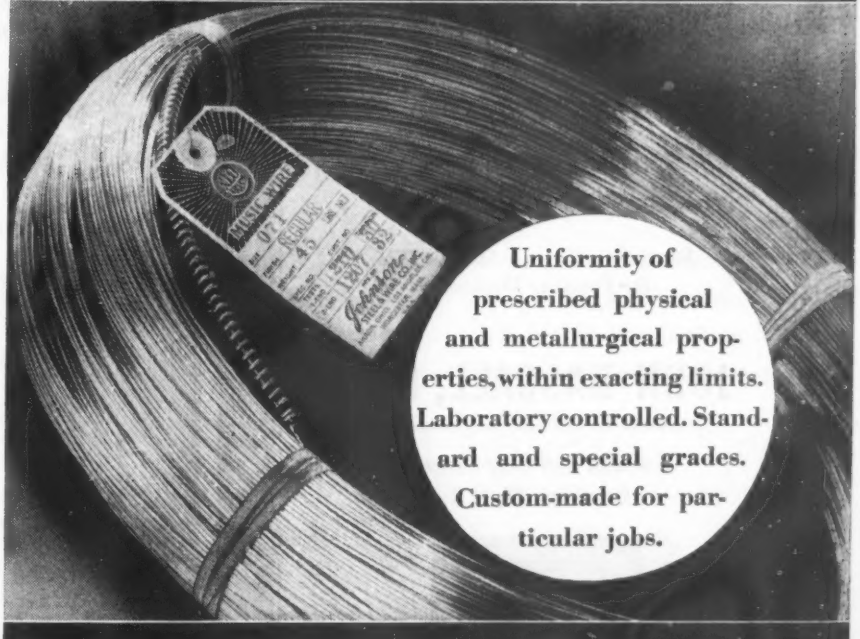
Gray Iron Castings

JOHNSON wire



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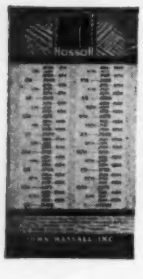
in meeting your problem

Does a special part for the product you make present a problem in design — in materials — in costs? Call on our consultant service for help — no obligation to you. Our engineering experience and our modern machines are both geared to flexibility in the manufacture of cold-forged specialties. In most cases, moreover, at a saving in costs to you.



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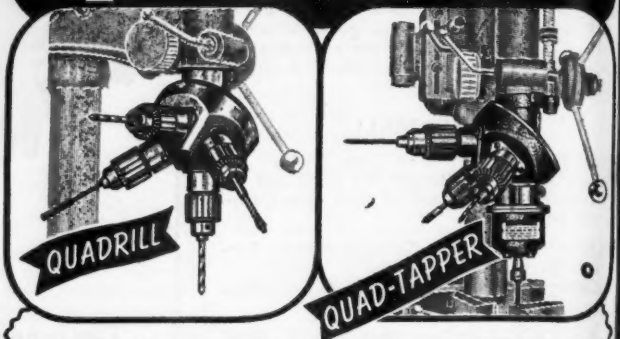

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ACT AT ONCE—IMMEDIATE DELIVERIES—WRITE TODAY!

CHICAGO Drillet Corporation 919 S Michigan Ave. Chicago 5, Illinois

RESULTS ARE WHAT COUNT... now more than ever. Why not measure the ultimate value of Preformed "HERCULES" (Red-Strand) Wire Rope by the accurate yardstick of performance? You will quickly discover that its long life and easy handling make for speedier production and greater efficiency. Available in both Round Strand and Flattened Strand constructions.

MADE ONLY BY

A. Leschen & Sons Rope Co.

WIRE ROPE MAKERS • • • ESTABLISHED 1857

ST. LOUIS, MISSOURI, U. S. A.

NEW YORK • CHICAGO • DENVER • SAN FRANCISCO • SEATTLE • PORTLAND

HOW CHANGE OF METHODS CUT ANNEALING TIME 65%

BETHLEHEM "TROUBLE SHOOTER" BREAKS BOTTLENECK IN MIDWESTERN PLANT

OPERATION: Production of alloy-steel armor-piercing shot forgings, in a large plant in the Midwest.

PROBLEM: To cut production time. Quality of forgings was high, but difficulties in annealing had necessitated a slow process that drastically reduced the quantity of material turned out.

SOLUTION: The matter was referred to our home office by the producer of these forgings. A Bethlehem metallurgist went immediately to the plant in question, studied every phase of the annealing problem. After sifting the facts, he installed a system of isothermal annealing, by means of which a uniform lamellar structure was maintained.

RESULTS: Hardness comparable to that of lamellar perlite; *a time saving of more than 65 per cent* over the conventional method of slow furnace cooling.

A chip from the nose-forming tool. "Papier mâché" effect indicates good machining properties.

To Bethlehem "trouble shooters," cases like this one are an almost daily diet. Our metallurgists do not claim to be magicians, but their years of practical experience have fitted them well to solve problems brought on by wartime. Perhaps they can help *you* work faster and more efficiently with steels.

If you have a question regarding analyses, properties, heat-treating, or applications, always feel free to consult with Bethlehem technicians —on either present or postwar problems.

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.
BETHLEHEM STEEL EXPORT CORPORATION, New York

★ BETHLEHEM STEEL ★

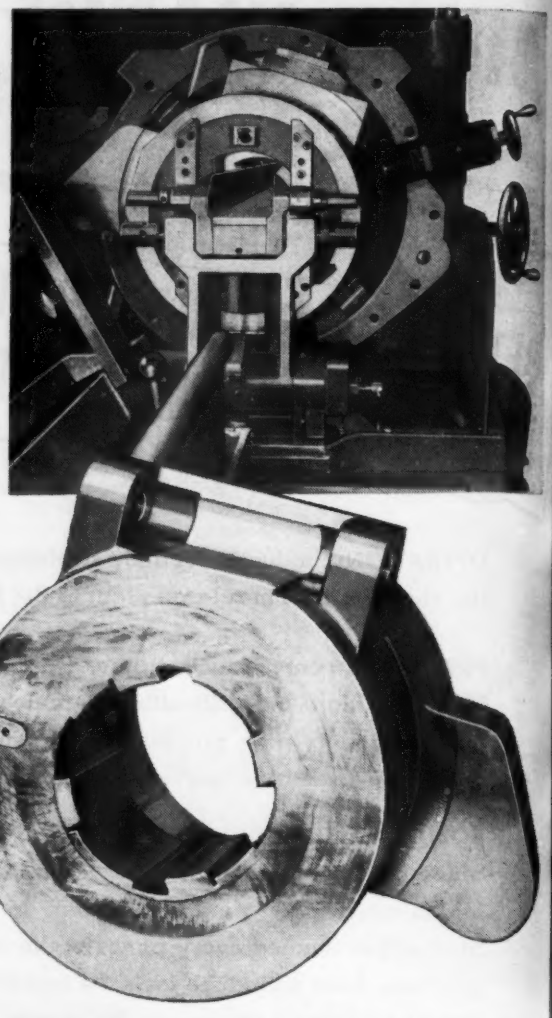
HERE'S HOW Broaching by *American* helps

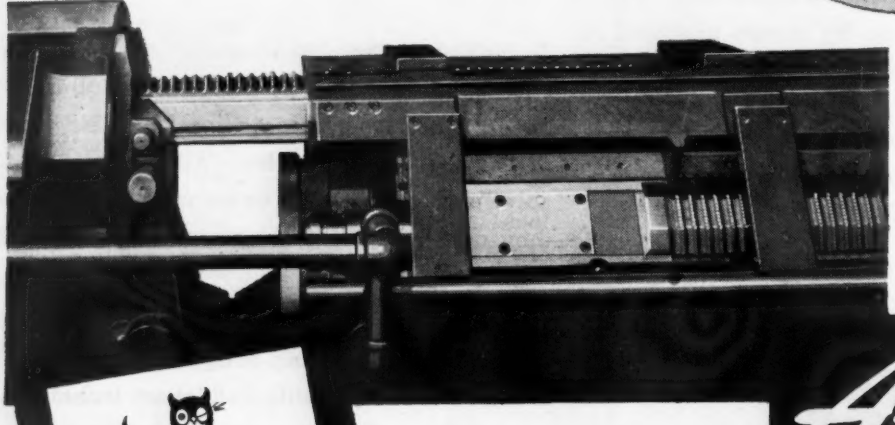
"KEEP UP THE BARRAGE"

Speed — speed in production — is a prime factor in the manufacture of big guns to keep our far-flung battlefronts ablaze. "More guns in a hurry" has been a constant demand from all parts of the world.

A high rate of production—plus fine finish and absolute accuracy—has been attained by *American* engineers in designing equipment for broaching lock step slots in 8″ howitzer breech rings. The setup makes use of two *American* H-60-72 horizontal broaching machines and eleven different broaches to accomplish this task.

Whether your production requires fast output, excellent finish, or accuracy to close tolerances, whether it involves the use of standard or special machinery, let *American* engineers recommend the correct broaching equipment to do the job. *American's* complete broaching service—machines, tools, and engineering—is at your disposal. Write for details today.





Slots in breech rings for 8″ howitzers are broached on two *American* H-60-72 broaching machines, identical except for various broaches required for this operation. Top photo shows fixture which indexes the part one-quarter turn after each cut. Lower photo is of the finished part.

Above: American H-60-72 broaching machine, used in broaching lock step slots in 8″ howitzer breech rings. Turret holds five broaches and revolves after each four cuts to bring next broach in position for cutting. A similar set-up with six-broach revolving turret is used for completing the part.

MEMBER BROACHING TOOL INSTITUTE

American

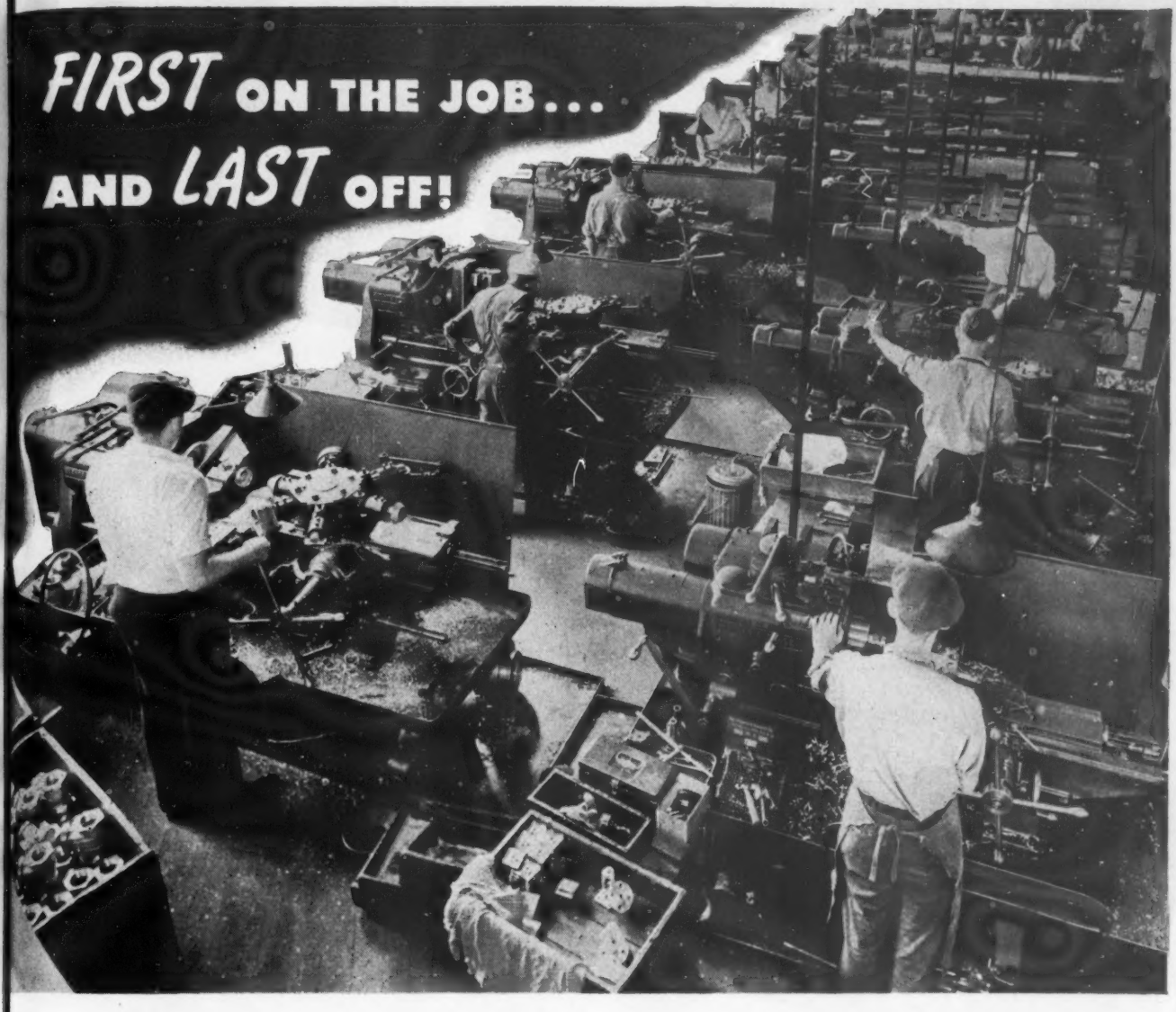
BROACH AND MACHINE CO.

ANN ARBOR, MICHIGAN

•

BROACHING MACHINES
PRESSES
BROACHING TOOLS
SPECIAL MACHINERY

DIVISION OF SUNDSTRAND MACHINE TOOL CO.



WHEN Pearl Harbor first shocked the country into action, "Put it on the Warner & Swaseys," was the battle cry of production men with urgent turning problems. Today, long, weary years later —years in which 3-shift days and 7-day weeks have tested men and machines to the utmost—it is significant to note that Warner & Swaseys are usually the last lathes to be laid off when a contract comes to a close.

Not only that! When the government-owned equipment in a plant is declared surplus, it's usually the Warner & Swaseys that are snapped up first by production-wise managements.

Why? The answer is simple! In the grueling, all-out test of machine tools, these Warner & Swasey machines simply stood up better, produced faster, gave less trouble.

When you plan your next equipment change, remember these war-proved facts. Let a Warner & Swasey Field Engineer help you choose the right Warner & Swasey war-tested turret lathes to boost your peacetime profits!

WARNER & SWASEY Cleveland

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS... WITH A WARNER & SWASEY

TURRET LATHES, SADDLE AND RAM TYPES—CHUCKING AND BAR TOOLS—PRECISION TAPPING AND THREADING MACHINE

WILL YOUR PLANT NEED MORE

Lifting Power?

This 270-ton giant Alliance gantry crane, recently installed on the Joe Wheeler Dam of TVA, combines unusual construction with beauty of design. The span is 90' . . . the short leg measures 16' and the long leg is 44' in length.

You know us as the **"world's largest builders of the world's largest cranes,"** such as the 270-ton gantry crane shown here . . . or as the originator of new ideas in cranes, such as the multiple range tongs for soaking pit cranes recently announced by us.

But do you know we are working with many customers on the altering of existing lifting facilities, as required by the revamping of a plant for new production?

You may want to relocate or step up the capacity of your present cranes. Alliance specialists can help you with this conversion by increasing or decreasing spans, changing hoist arrangements, or in other ways.

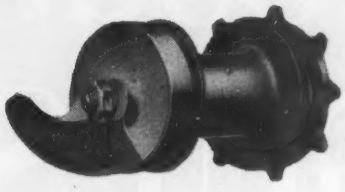
Check with The Alliance Machine Company for cost-saving recommendations on new cranes or reconversion of old cranes.

Alliance

THE ALLIANCE MACHINE COMPANY • ALLIANCE, OHIO

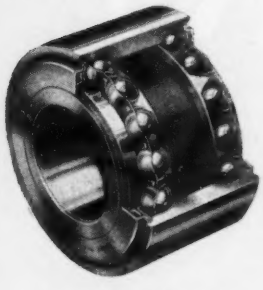
PITTSBURGH OFFICE : 1622 OLIVER BUILDING

FAMOUS "FIRSTS" by NEW DEPARTURE



First Bicycle Coaster Brake

First Yellow Taxicab

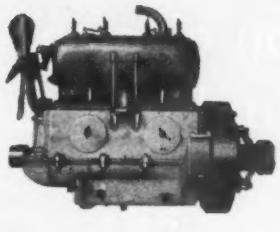


First Self-Sealed Lubricated-for-Life Mine Car Bearing

First Conveyor Roll Bearing

First Dual-Purpose Ball Bearing

First Self-Sealed Bearing Lubricated-for-Life

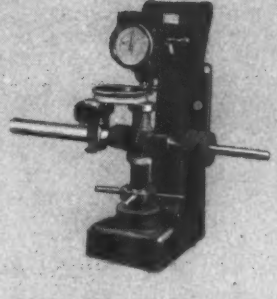


First Engine with Cylinders Cast en Bloc

First Successful Treadle Roll Bearing for Textile Looms

First Fan and Pump Shaft Bearing Self-Sealed and Lubricated-for-Life

3295



Rockwell Hardness Tester

The name New Departure aptly describes an organization whose thought and action has ever been in advance of its time.

A partial record of the "new departures by New Departure" is reported on this page.

Well over 300 million New Departure ball bearings are in this war, and we will stay with this task until the job is done.

Your future use of ball bearings might well take advantage of New Departure's creative engineering.

Nothing Rolls Like a Ball

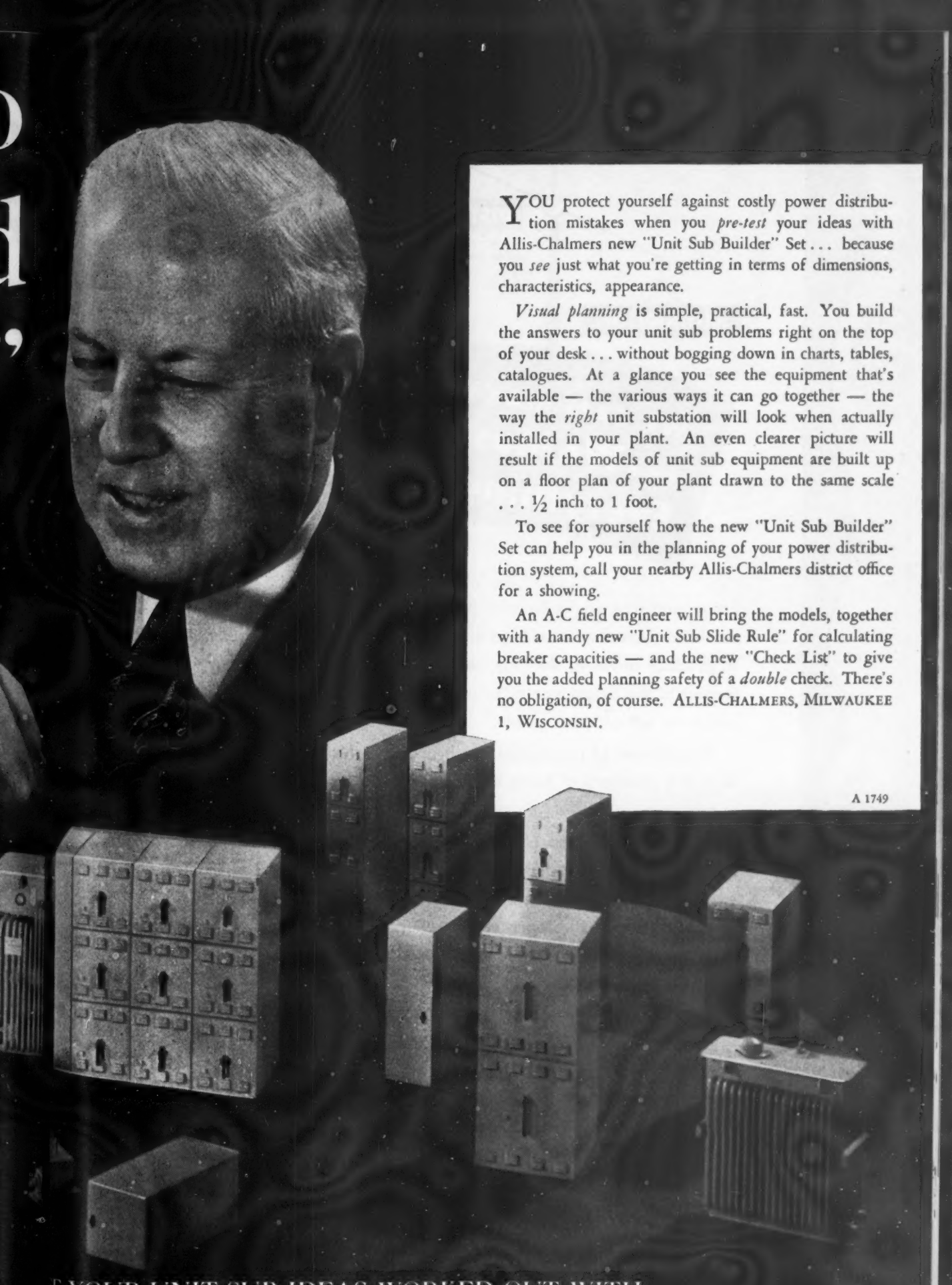
NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT • DETROIT • CHICAGO • LOS ANGELES

Say Goodbye to "BY-GUESS and BY-MEMORY"

That's what you do
when you plan unit substations
visually — with new
scale models of Allis-Chalmers
Prefabricated
Unit Substation elements.
You plan faster and play safer!

Scale of Models:
½ in. = 1 ft.

ALLIS



YOU protect yourself against costly power distribution mistakes when you *pre-test* your ideas with Allis-Chalmers new "Unit Sub Builder" Set . . . because you *see* just what you're getting in terms of dimensions, characteristics, appearance.

Visual planning is simple, practical, fast. You build the answers to your unit sub problems right on the top of your desk . . . without bogging down in charts, tables, catalogues. At a glance you see the equipment that's available — the various ways it can go together — the way the *right* unit substation will look when actually installed in your plant. An even clearer picture will result if the models of unit sub equipment are built up on a floor plan of your plant drawn to the same scale . . . ½ inch to 1 foot.

To see for yourself how the new "Unit Sub Builder" Set can help you in the planning of your power distribution system, call your nearby Allis-Chalmers district office for a showing.

An A-C field engineer will bring the models, together with a handy new "Unit Sub Slide Rule" for calculating breaker capacities — and the new "Check List" to give you the added planning safety of a *double* check. There's no obligation, of course. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

A 1749

E YOUR UNIT SUB IDEAS WORKED OUT WITH

LIS CHALMERS *"Unit Sub Builder" Set*

DISTRIBUTION
When production overbalances distribution, when we fail to distribute what we can produce, production is throttled, jobs are fewer, standards of living decline.
PRODUCTION
WE CAN MAKE ANYTHING
...We Must Sell All of
Everything We Make

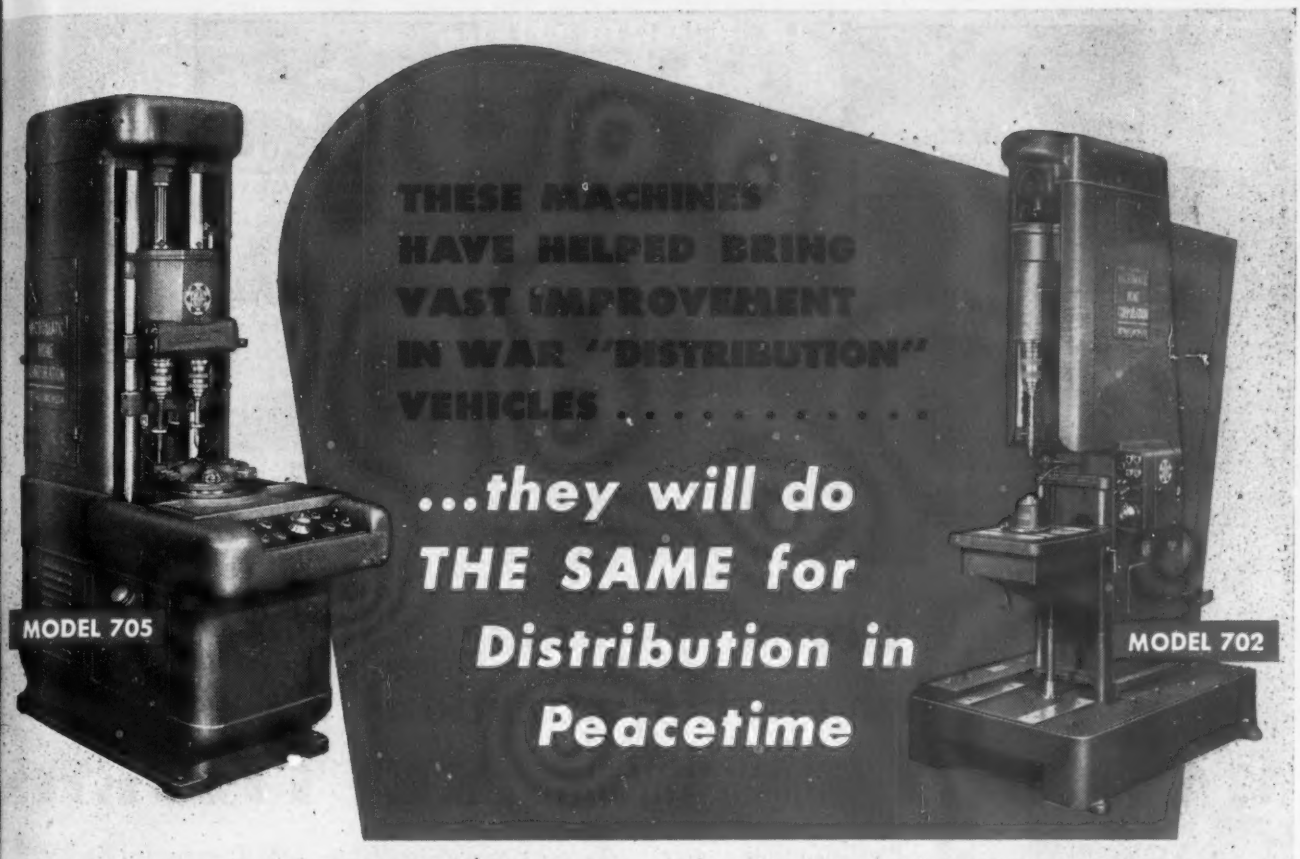
For a long time we in America have derived great comfort and assurance from the knowledge that we have the industrial ability to produce anything we may need or want. We have tied our wagon to the bright star of producing more products at higher wages to sell at lower prices.

This concept of production has brought us the largest expansion in a standard of living of any people in history.

But, while we have always been able to make anything, we have not always been able to sell all of everything we could make. We have not devoted the same enterprising energy to expanding distribution that we have to production. So, in the past, for immediate short swing relief we have resorted to government imposed restrictions on production and distribution. This expedient did not bring worth-while relief, for in the end it added up to fewer jobs, less production—higher prices.

If commerce and industry will use its inspirational ability and ingenuity to find better, cheaper methods of distribution per unit our goal of full employment may easily be accomplished and we can return to the enviable position of enjoying an expanding standard of living.

MICROMATIC HONE CORPORATION
DETROIT 4, MICHIGAN



While cost is a secondary consideration in distribution of war materials, other needs parallel peacetime distribution. Lighter, more easily operated equipment—higher pay loads—easier maintenance, and less of it—are all vital. Micromatic Honing machines have helped wartime distribution to these goals—will do the same for industry after the war. At the same time they will help lower initial and operating costs of distribution machinery—lower costs of goods delivered.

MODEL 705

VERTICAL HYDROHONER

Micromatic Model 705 Multiple Spindle Vertical Hydrohoner has built-in automatic Microsize Control which gauges work automatically—holds within tolerance of .0001" for geometric accuracy and .0003" for *uniform diameter size*—automatically stops honing cycle when correct size is reached. For internal honing or bores ¼" to 2" diameter. Rotary indexing work fixture provides high production. Usually recommended for maximum stock removal ranging from .0005" to .0015" on hardened parts—.001" to .010" on soft or medium hard. (Illustrated above, left).

Precision sphericity without measurable error is generated on ball studs by the Micromatic Ball Stud Honer.

Removes .030" stock on diameter from turned heat treated forgings.

Precision honing of long pieces—external or internal—is the work of the Micromatic Horizontal Floor Type Honer. Either hydraulic or manual control or tools. Set-ups available to generate either cross-hatch or co-directional finish patterns.

MODEL 702 Single Spindle Type HYDROHONER

Single Spindle Type Micromatic Hydrohoner Model 702 for rapid production honing of bores or cylindrical surfaces up to 2" in diameter. (Illustrated above, right).

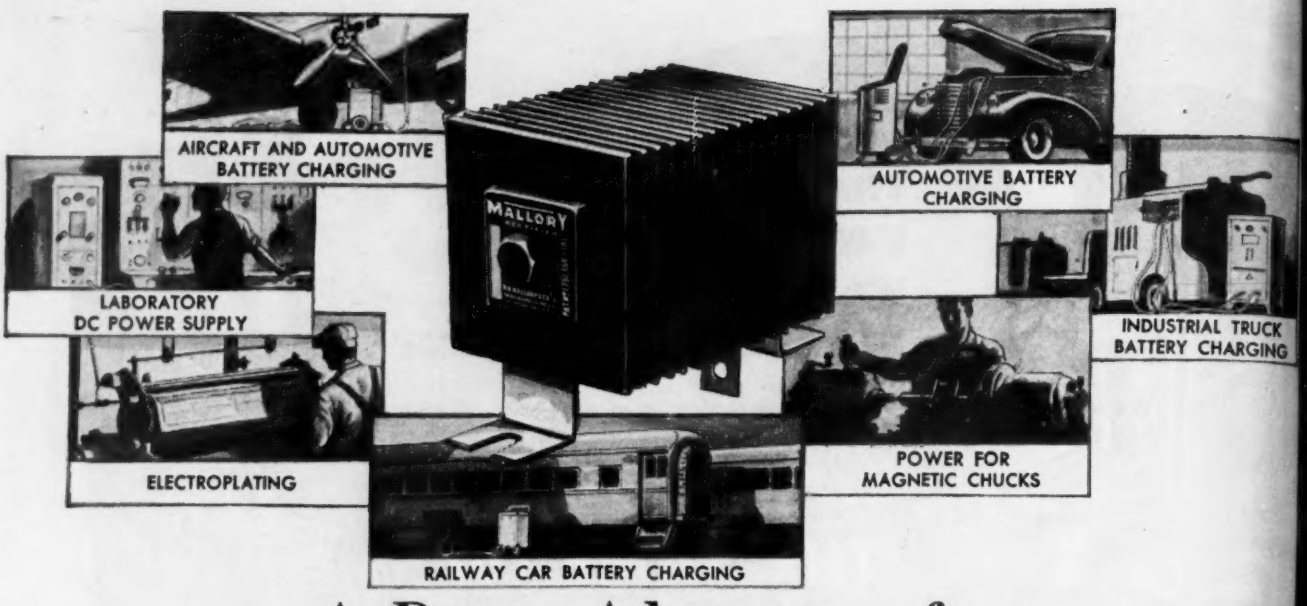
Silver plated bearings are production honed on a Micromatic Horizontal. Costs were reduced 50% from previous methods.

MICROMATIC HONE CORPORATION

DETROIT 4, MICHIGAN

DISTRICT OFFICES: 614 Empire Building, 206 South Main Street, Rockford, Illinois • 129 Church Street, New Haven 10, Connecticut
501 Harries Building, 137 North Main Street, Dayton, Ohio • 1031 South Broadway, Los Angeles 15, California

MAKERS OF HONING MACHINE TOOLS



A Dozen Advantages for Dozens of Applications...

MALLORY MAGNESIUM-COPPER SULPHIDE RECTIFIERS

WHEREVER you need a dependable source of low voltage DC, Mallory Dry Disc Rectifiers provide these 12 advantages:

1. *Long Life*—Properly applied, many Mallory Rectifiers have been in continuous operation for more than five years!

2. *More compact* than any other dry disc rectifier because the high current rating of the rectifier junction permits much smaller size.

3. *Rugged, all-metal construction* — practically immune to mechanical damage and able to withstand severe shocks or sustained vibration.

4. *Completely sealed* to resist atmospheric extremes.

5. *Constant output* over a range of ambient temperatures from —40°F. to 265°F. or higher. No "aging"—constant output throughout the rectifier's long life.

6. *Will withstand heavy current overloads* — tested up to 527°F.

7. *Self-healing rectifying film* if subjected to abnormal high voltage surges.

8. *Excellent voltage regulation* over a wide range.

9. *Unity power factor.*

10. Practically no *power consumption* at "no load".

11. *Silent operation—no maintenance cost,* since there are no moving parts to wear out.

12. *Wide range of sizes and ratings*—Mallory Rectifiers are available in sizes ranging from a tiny "button" to large heavy-duty stacks, in capacities from 0.3 ampere to 175 amperes DC and higher.

Mallory manufactures the following complete rectifier units: Rectostarters* for aircraft . . . Battery chargers for automotive, aviation, railroad and industrial truck service . . . Rectopower† supplies for low voltage, medium and high current applications.

Write for descriptive catalogs, showing specifications and many applications of Mallory Magnesium-Copper Sulphide Rectifiers. Our engineers will be glad to help if you have a special problem. Or see your nearest Mallory Distributor.

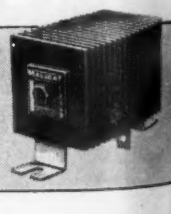
†*Rectopower is the registered trademark of P. R. Mallory & Co., Inc., for rectifier power supply units.*

P. R. MALLORY & CO., Inc.,
INDIANAPOLIS 6, INDIANA

**Rectostarter is the registered trademark of P. R. Mallory & Co., Inc., for rectifier units for use in starting internal combustion engines.*

P. R. MALLORY & CO. Inc.
MALLORY RECTIFIERS

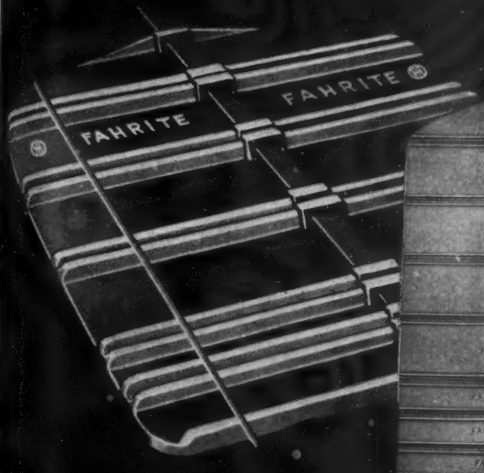
MAGNESIUM COPPER SULPHIDE RECTIFIERS—
STATIONARY AND PORTABLE D. C. POWER SUPPLIES—
BATTERY CHARGERS AND AVIATION RECTOSTARTERS*

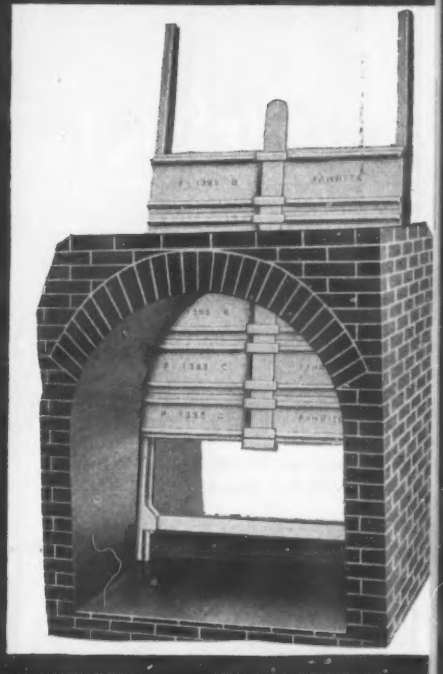


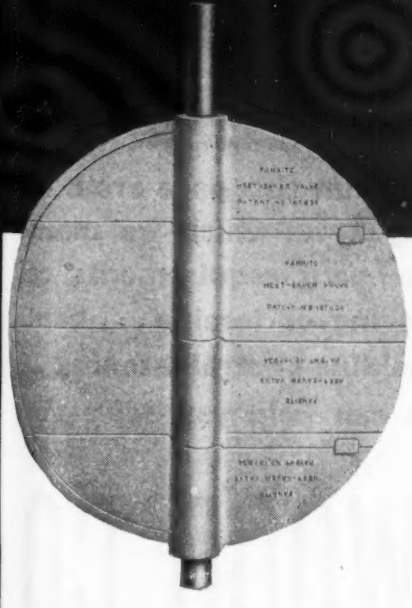
Insure better performance at lower installation and maintenance costs... get Heat Saver Valves in

FAHRITE

HEAT AND CORROSION *Alloys*







FAHRITE Heat Saver Valves, like all other FAHRITE castings, retain their efficiency even under sustained elevated temperatures. FAHRITE Heat Saver Valves are simple—mechanisms are less costly—providing lighter weight, greater ease of operation and lower B.T.U. loss. There's no accumulation or coking at seat from coolin no failure due to muddy or acid water. And finally, these valves do not grow, warp, crack, oxidize or corrode.

These and other FAHRITE castings can be supplied to custom specifications in the grade exactly suited to your operating conditior

The Ohio Steel Foundry Co.

Springfield, Ohio

Plants at Lima and Springfield, Ohio

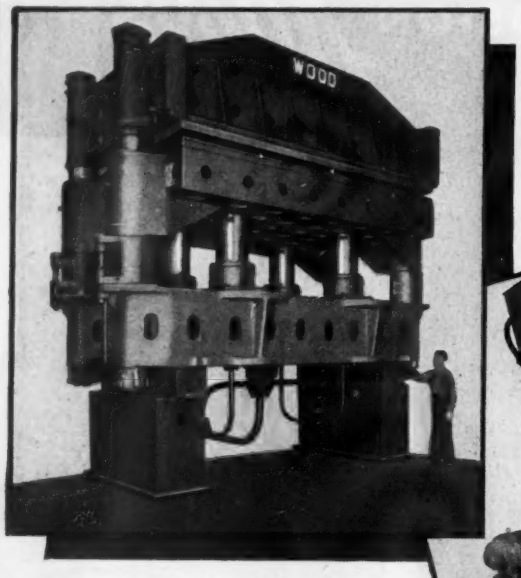
ENGINEERS
FOUNDERS
MACHINI

ARMY E NAVY

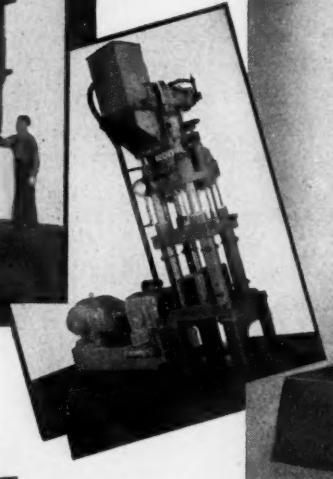
FREE ENTERPRISE IS THE ONLY WAY TO CONSTANTLY HIGHER AMERICAN LIVING STANDARDS

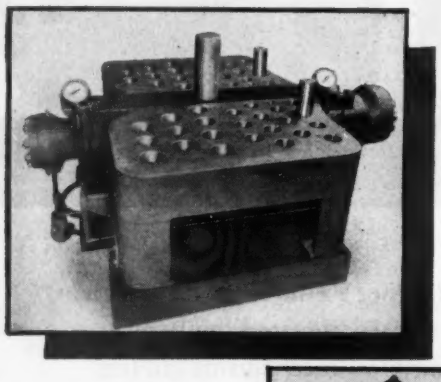
HYDRAULIC PRESSES....

OF EVERY TYPE!

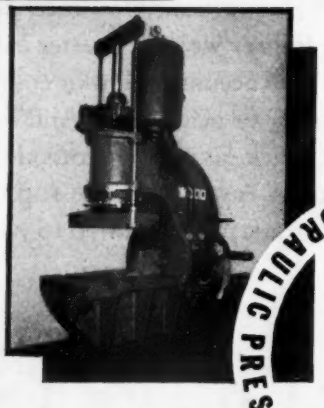


(Above) 800 Ton Wall Board Press with Platen Size of 9'1" x 13'10".





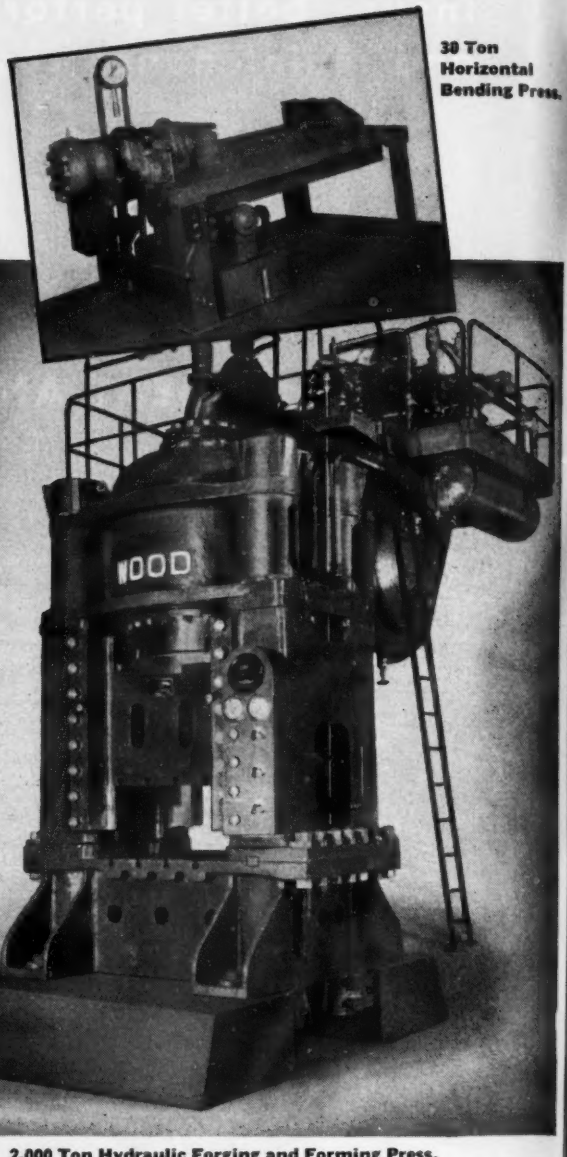
(Above) 125 Ton Carbon Electrode Stub Press.



(Above) Double-ended Pipe Bending Press of 62½—125 Ton Capacity.

★

Joggling Press of 350 Ton Capacity.



30 Ton Horizontal Bending Press.

2,000 Ton Hydraulic Forging and Forming Press.

The presses shown on this page are but a few of the many types which we manufacture. Whether your requirements call for forging, flanging or forcing . . . bending, joggling, molding or straightening . . . Wood engineers can help you solve your press problems.

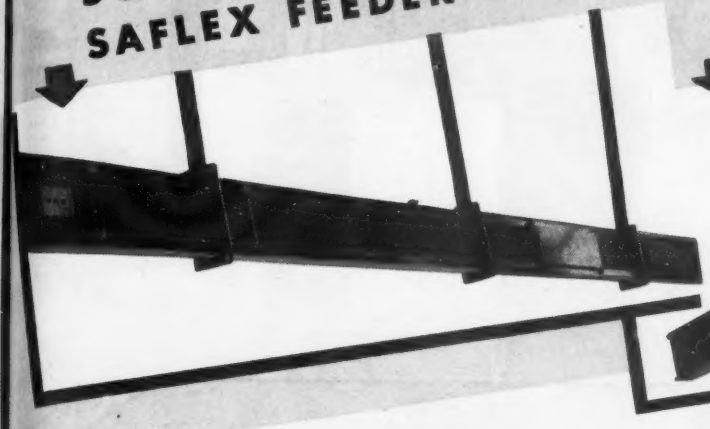
R. D. WOOD CO.

PHILADELPHIA • PENNSYLVANIA

HYDRAULIC PRESSES FOR EVERY PURPOSE

FOR EFFICIENT POWER DISTRIBUTION

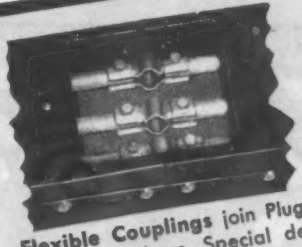
SQUARE D SAFLEX FEEDER DUCT



SQUARE D SAFLEX PLUG-IN DUCT

Square D Saflex Feeder Duct is designed to serve as the feeder between transformer banks and main switchboard or as feeders to branch circuits where minimum voltage loss is essential. Because of its low reactance and consequent balanced low voltage drop (1.8 volts per 100 feet) it is ideally suited for welder circuits —enables conductor size to be kept at a minimum. Feeder duct is available in standard 10-foot sections with special fittings to meet all types of installations. WPB sizes of 800, 1000, 1350 and 2000 ampere capacities.

Square D Plug-In Duct is a perfect running mate for Feeder Duct. It permits plugging-in machines whenever and wherever they are needed. Units are easily attached and disconnected. 100% salvage for re-use. Available in 250, 400 and 600 ampere capacities.

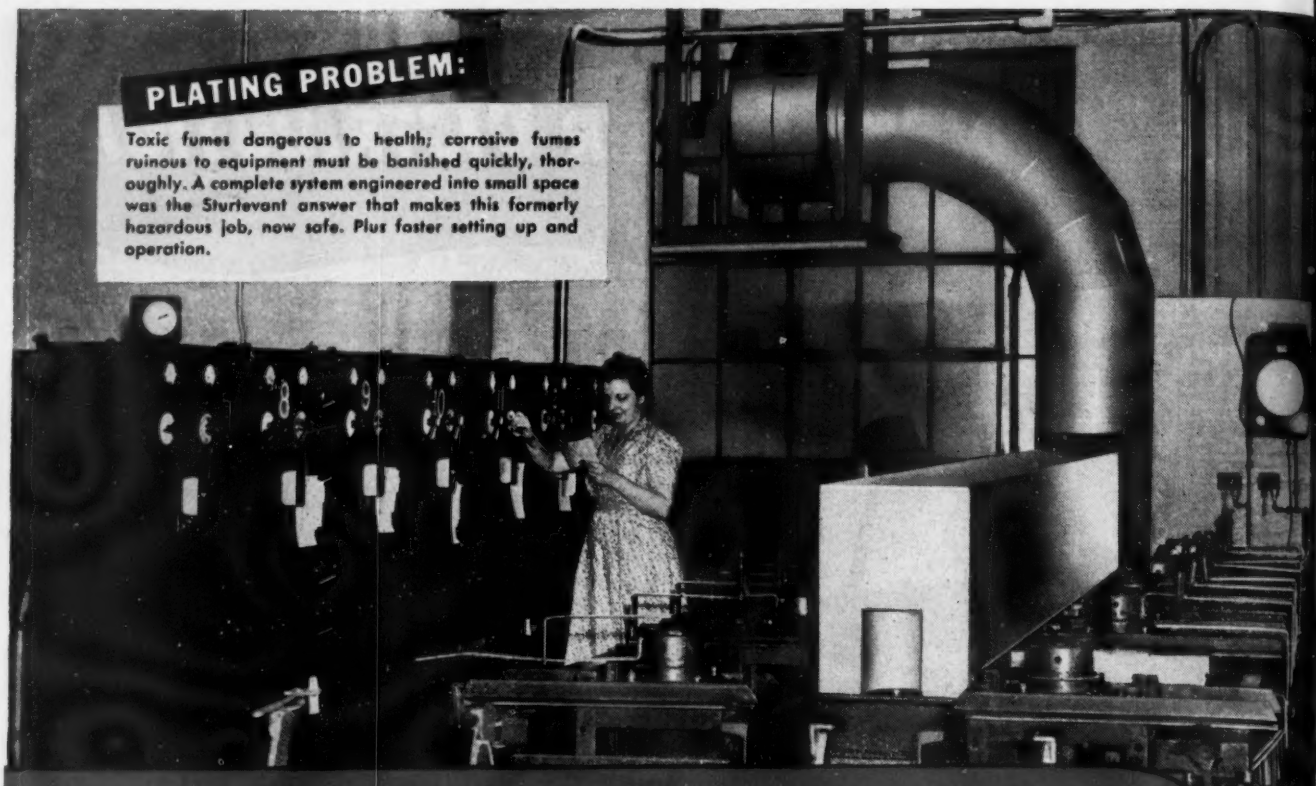


Flexible Couplings join Plug-In-Duct bus bars. Special design permits expansion or contraction to be absorbed at the joint, and also provides flexible connections for correction of minor variations in bus alignment. Notice use of round tubular buses which afford highest possible mechanical strength when subjected to heavy short circuit stresses.

Units Easy to Attach. Hook-type bracket on top of plug-in unit attaches to top of duct. Unit is then swung down and jaws snap into position on bus bars—tightened securely with a single screw—on or off in a jiffy. 10 units may be attached to each 10' section.

SQUARE D COMPANY

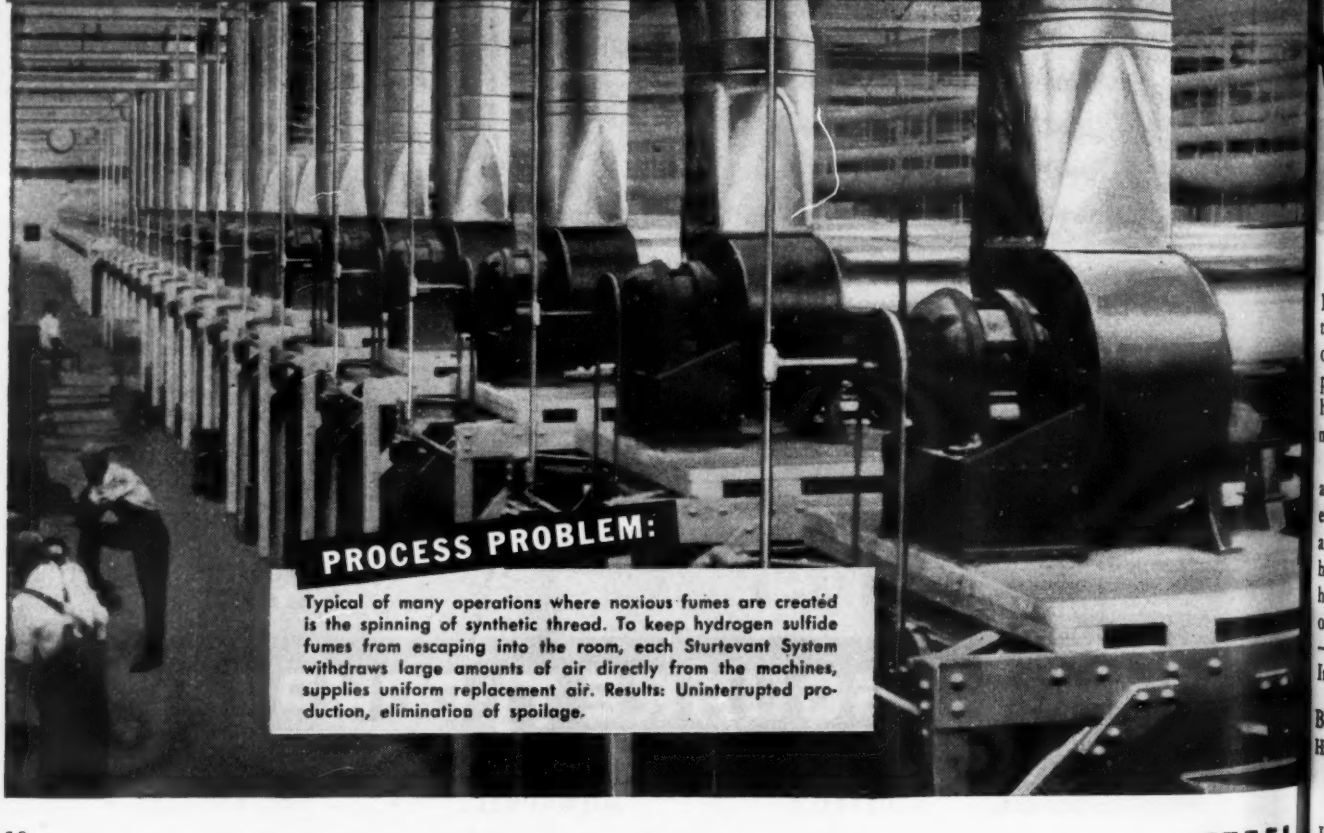
DETROIT • MILWAUKEE • LOS ANGELES



PLATING PROBLEM:

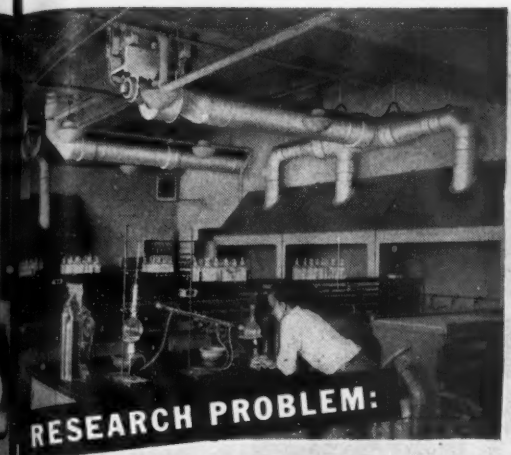
Toxic fumes dangerous to health; corrosive fumes ruinous to equipment must be banished quickly, thoroughly. A complete system engineered into small space was the Sturtevant answer that makes this formerly hazardous job, now safe. Plus faster setting up and operation.

Fume Problems Once— "Success Stories" Now!



PROCESS PROBLEM:

Typical of many operations where noxious fumes are created is the spinning of synthetic thread. To keep hydrogen sulfide fumes from escaping into the room, each Sturtevant System withdraws large amounts of air directly from the machines, supplies uniform replacement air. Results: Uninterrupted production, elimination of spoilage.

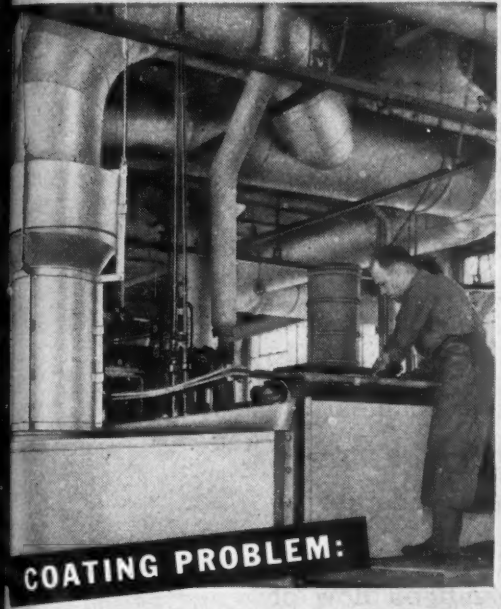


RESEARCH PROBLEM:

When this chemical laboratory is filled with technicians, each working on a different project, an adequate fume control system is a "must." Notice the wide hoods that trap noxious odors and dangerous vapors, leaving the large center area unobstructed, shadow-free, clean.

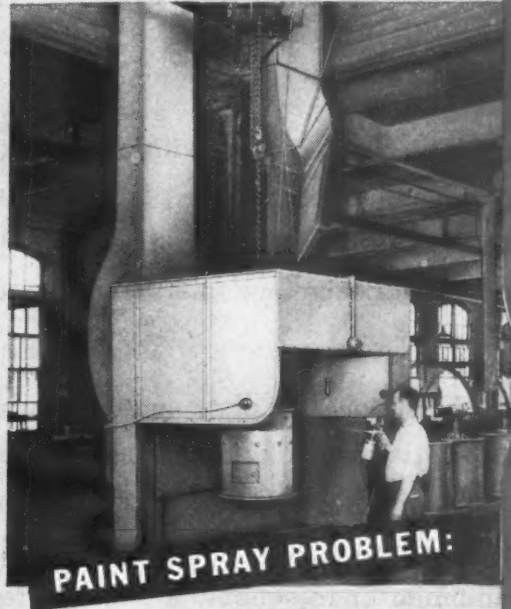
CLEANING PROBLEM:

Cleaning and degreasing baths for small metal parts pose a pretty question, especially when mass production is required. Here, with this long row of tanks, strategic location of hoods and fans plus correctly engineered duct work, gives operators fume-free air and plenty of working room.



COATING PROBLEM:

Note how this anodic finishing bath is freed of the conventional overhead hood. The individual fume remover located at the side and end of the tank captures the dangerous vapors more efficiently. Duct design cuts power costs; more "elbow room" for operators speeds work.



PAINT SPRAY PROBLEM:

Fume-laden air can play havoc with men, machines and production rates. But this Sturtevant Engineered System fits right over the production line, "fences-in" the work and carries off fumes. Operator handles more parts—is not encumbered by a respirator.

VENTILATING

DRYING

HEATING

MECHANICAL DRAFT

DUST AND FUME CONTROL

AIR CONDITIONING

EVERY CASE PICTURED HERE—and hundreds more like them—is the result of asking—and getting an *engineered* answer to a lot of questions. Questions like these: Which type of fan? The best place to locate it? How should the duct work be set up? How to handle the fumes after they are collected? How about replacement air? Are power and maintenance costs held to a minimum?

Answer these questions—*but answer them right*—and you get a Fume Control System that leaves nothing to be desired, in efficiency and economy. But, that takes a lot of "know-what" and "know-how". From Sturtevant you get both! Our engineers have the complete Sturtevant Line to work with—*all* types of air handling equipment—instead of trying to solve problems with one or two. In addition, they have an 85 year fund of experience—throughout the length and breadth of industry—to draw upon. It all adds up to a "success story" for *your* fume problem.

Sturtevant
REG. U.S. PAT. OFF.
Puts Air to Work

B. F. STURTEVANT COMPANY
Hyde Park Boston 36, Mass.

IS IT LATER THAN YOU THINK?

Oiljak, like other American manufacturers, continues to devote all its facilities to the production of war material, to speed the approaching day of victory.

Yet, at the same time, we consider it no less our duty to plan for the future, to do our part in easing the change-over to a healthy industrial economy during the competitive peacetime years that lie ahead of American industry.

Oiljak offers you complete manufacturing facilities with up-to-date machines operated by men whose production record on war contracts compares favorably with normal peacetime costs; a record achieved by a minimum of rejections, a steady streamlined flow of work and materials through the plant, and a special assembly-line technique for which Oiljak is famous.

So before you set up the manufacturing procedure for *your* peacetime products, it may well be worth your while to get acquainted with all the facilities which Oiljak can offer you.

MACHINING • STAMPING • WELDING • PLATING • FINISHING • ASSEMBLING

METAL MANUFACTURERS

THE OILJAK MANUFACTURING Co., INC.

MONTCLAIR, NEW JERSEY

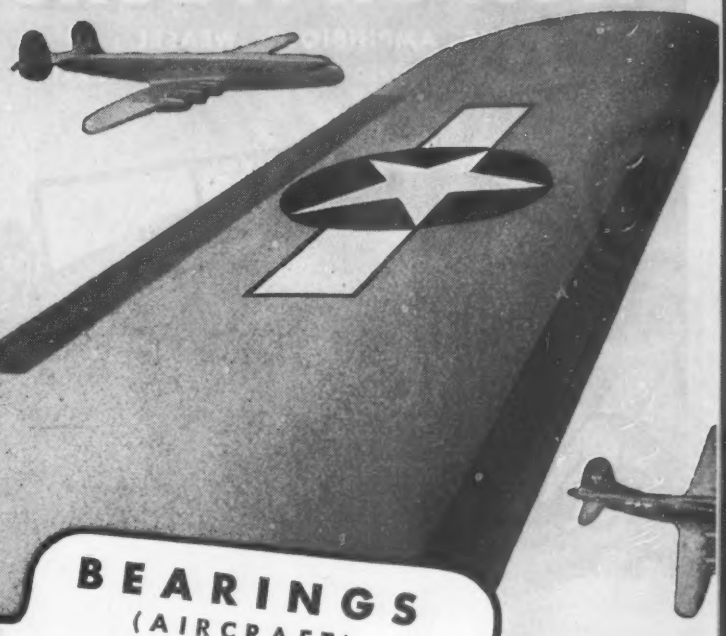
THE JOB COMPLETE FROM BLUEPRINT TO FINISHED PRODUCT

THE FIGHTERS OF TODAY AND THE FLAGSHIPS OF TOMORROW

nother tough cleaning problem olved by "THE PENN SALT MAN!"

HE aircraft industry has offered some of the toughest metal cleaning and plating oblems in war production plants. It has been r privilege to be helpful through our prod-ts and our men in the solution of many such oblems. Both the men and the products of nn Salt's Special Chemicals Division are pre-red not only for these war-time services but e equally well prepared for reconversion and e problems of the future.

re is an actual case of a leading aircraft gine manufacturer, drawn from our files:



BEARINGS
(AIRCRAFT)

PRODUCTS USED: PENNSALT CLEANERS EC-10, No. 37, and K-7 BEFORE LEAD PLATING WITH PENNSALT LF-42

PROBLEM: To remove slushing oil from copper-lead alloy and silver plated steel bearings prior to lead plating.

EQUIPMENT: Plating done in individual pyrex glass plating tanks, large enough to accommodate one bearing. Conventional soak and electrolytic cleaning tanks.

OUR METHOD:

1. Preclean with Pennsalt EC-10 (solvent dip) followed by spray water rinse.
2. Soak clean in Pennsalt #37, 6 oz/gal., 5 to 10 minutes, 190 to 200° F.
3. Hot water rinse.
4. Electroclean in Pennsalt K-7, 8 oz/gal., 190° F., 15 to 30 seconds—work made the cathode.
5. Hot water rinse.
6. Lead plating solution made up of one part Pennsalt LF-42 to two and one-half parts water —with glue addition. Used at room temperature, 15 amps./sq. ft., for 28 minutes, which plates .001" thickness.
7. Cold water rinse.
8. Cyanide dip.
9. Indium plate.

COMMENTS: This cycle employs four Pennsalt Products.

"THE PENN SALT MAN FIRST A TECHNICIAN . . . THEN A SALESMAN

Penn Salt Special Chemicals Division men are well trained in the application of chemicals to industry's problems. If you have a metal cleaning problem, don't hesitate to seek the advice of "THE PENN SALT MAN." He will advise you without obligation.

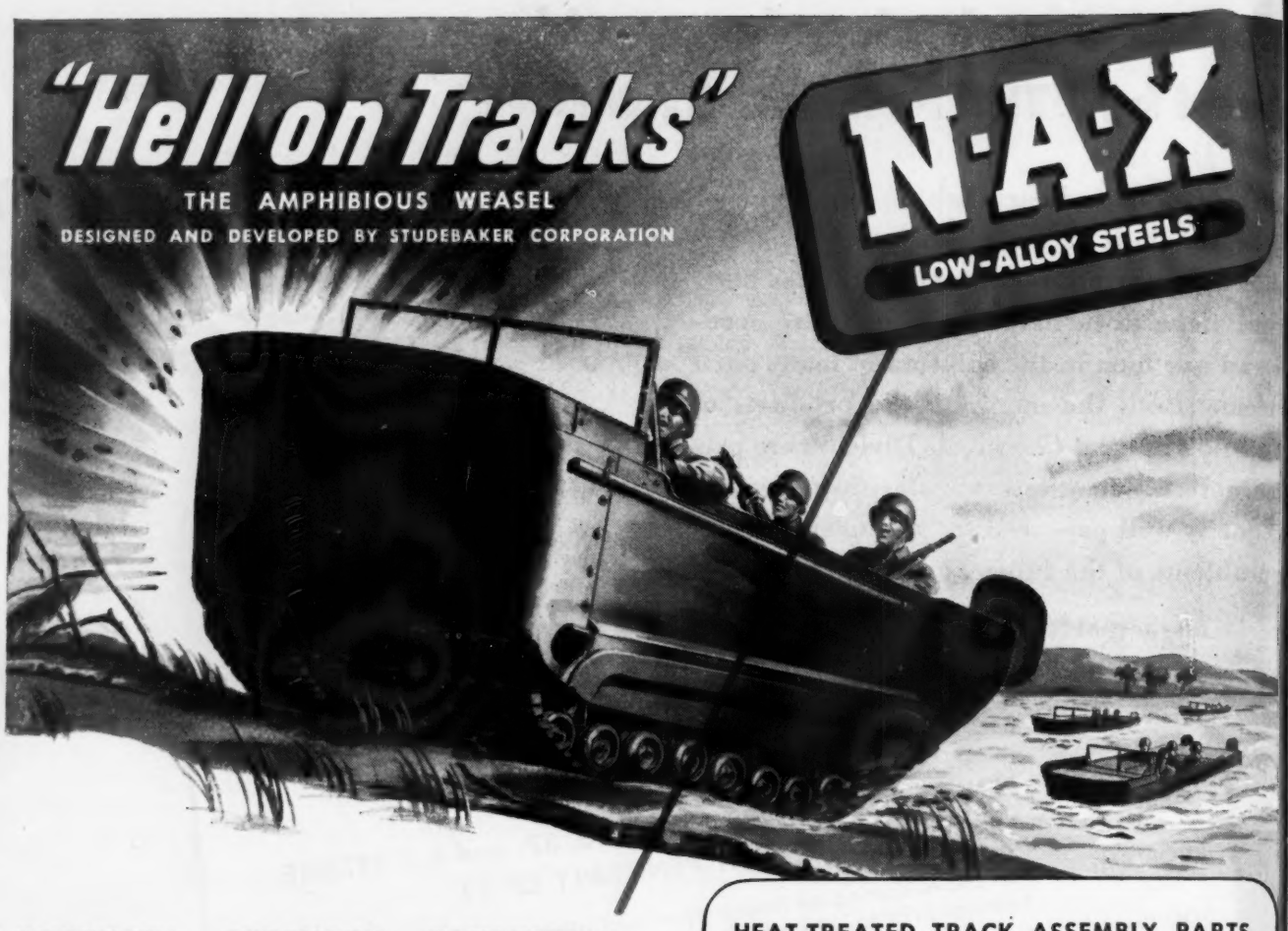
SPECIAL CHEMICALS DIVISION

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals

1000 WIDENER BUILDING, PHILADELPHIA 7, PA.

York • Chicago • St. Louis • Pittsburgh • Cincinnati • Minneapolis • Wyandotte • Tacoma



DUCTILITY—STRENGTH—TOUGHNESS PUT N-A-X 9120 ON THE JOB

The track assembly parts of the amphibious Weasel call for something pretty special in *steel* to meet the requirements.

It must have *ductility* to permit cold-forming into difficult stampings. And it must have good *hardenability* and response to heat-treatment to make it strong and tough.

N-A-X 9120 combines these properties in one great steel, and provides in addition excellent weldability for the fabrication of the track shoe. Together, these track parts furnish a good example of the outstanding work being done with versatile N-A-X alloy steels. Consult Great Lakes for assistance in determining the best steel of this series for your particular requirements.

HEAT-TREATED TRACK ASSEMBLY PARTS COLD-FORMED OF N-A-X LOW-ALLOY STEEL

CROSS PLATE

GUIDE

BOTTOM GUIDE WHEEL

TOP GUIDE WHEEL

SHOE

GREAT STEELS FROM GREAT LAKES

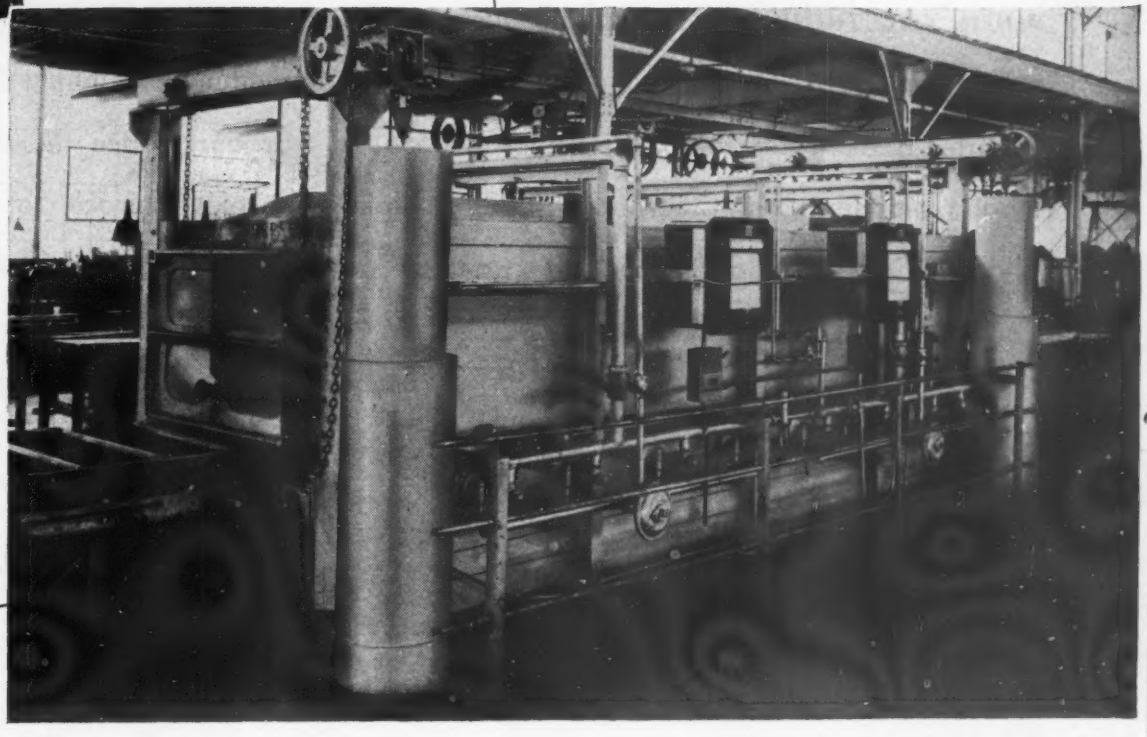
GREAT LAKES STEEL *Corporation*

N-A-X ALLOY DIVISION · DETROIT 18, MICHIGAN

UNIT OF NATIONAL STEEL CORPORATION

FABRICATOR FINDS { Production Doubled, Costs Down, Rejects Eliminated WITH NEW GAS FURNACE

Ilsco COPPER TUBE & PRODUCTS, Inc.
Mariemont
CINCINNATI 27, OHIO



The Ilsco Copper Tube & Products, Inc., of Mariemont, (Cincinnati), Ohio, fabricator of copper alloy products including tubing, connectors and electrical switch parts, recently installed a new copper annealing Gas furnace. Studies of its operation have shown that production has doubled, a decrease in fuel costs has been noted and loss through rejects eliminated.

Further advantages in exacting temperature control and adaptability to production line technique are mentioned by Mr. A. H. Stubbers, President of the Company. Although production has doubled, this new Gas furnace occupies no more space than its predecessor.

Learn, for your own profit and improved production, of the advantages of Gas and Gas equipment. Your local Gas Company's Industrial Engineer will advise you, without obligation.

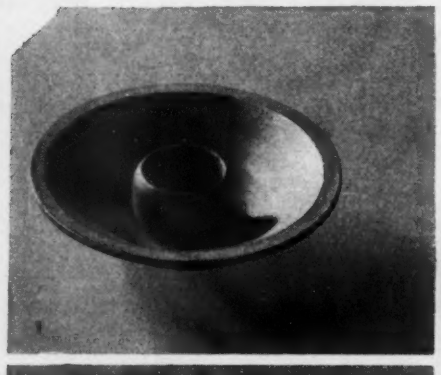
THE TREND IS TO GAS
FOR ALL INDUSTRIAL HEATING

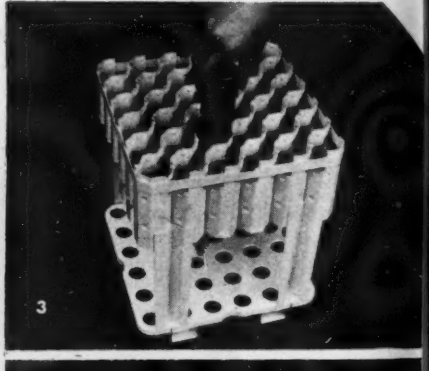
AMERICAN GAS ASSOCIATION
INDUSTRIAL AND COMMERCIAL GAS SECTION
420 LEXINGTON AVENUE, NEW YORK 17, N. Y.

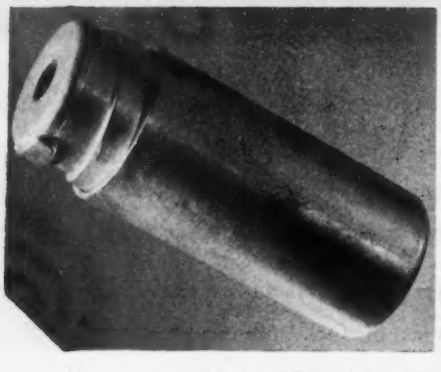
BUY WAR BONDS . . . HELP SPEED VICTORY!

Think of Stampings First!

WHEN YOU THINK of post war products be sure to consult with pressed metal experts *before you begin designing*. Stampings and stamping assemblies have for decades been a keystone of mass production. In war and peace the stamping industry has served all other industries . . . helping to achieve miracles of production . . . higher standards of living . . . a more powerful and prosperous America.

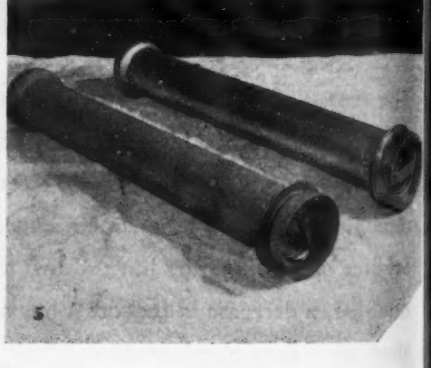






A FEW OF THOUSANDS OF WAR PRODUCTS MADE OF STAMPINGS

1. COINING TO CLOSE DIMENSIONS
2. ROCKET LAUNCHER TUBES
3. WELDED AMMUNITION BOX
4. HYDROSTATIC FUSE ASSEMBLY
5. 3' CARTRIDGE CONTAINER



THINK *of the incredible growth of the stamping industry during the war. More stampings have been made during the past two years than during the preceding ten. The experience gained by the industry as a result of this expansion will revolutionize thousands of products postwar. When you plan ahead plan to save time and money—think of stampings first!*

The Pressed Metal Institute is a nationwide association of leading pressed metal manufacturers, organized to advance the art and to assist other industries to take full advantage of latest stamping methods and techniques.

ADVANCE WITH STAMPINGS
PMI
PRESSED METAL INSTITUTE

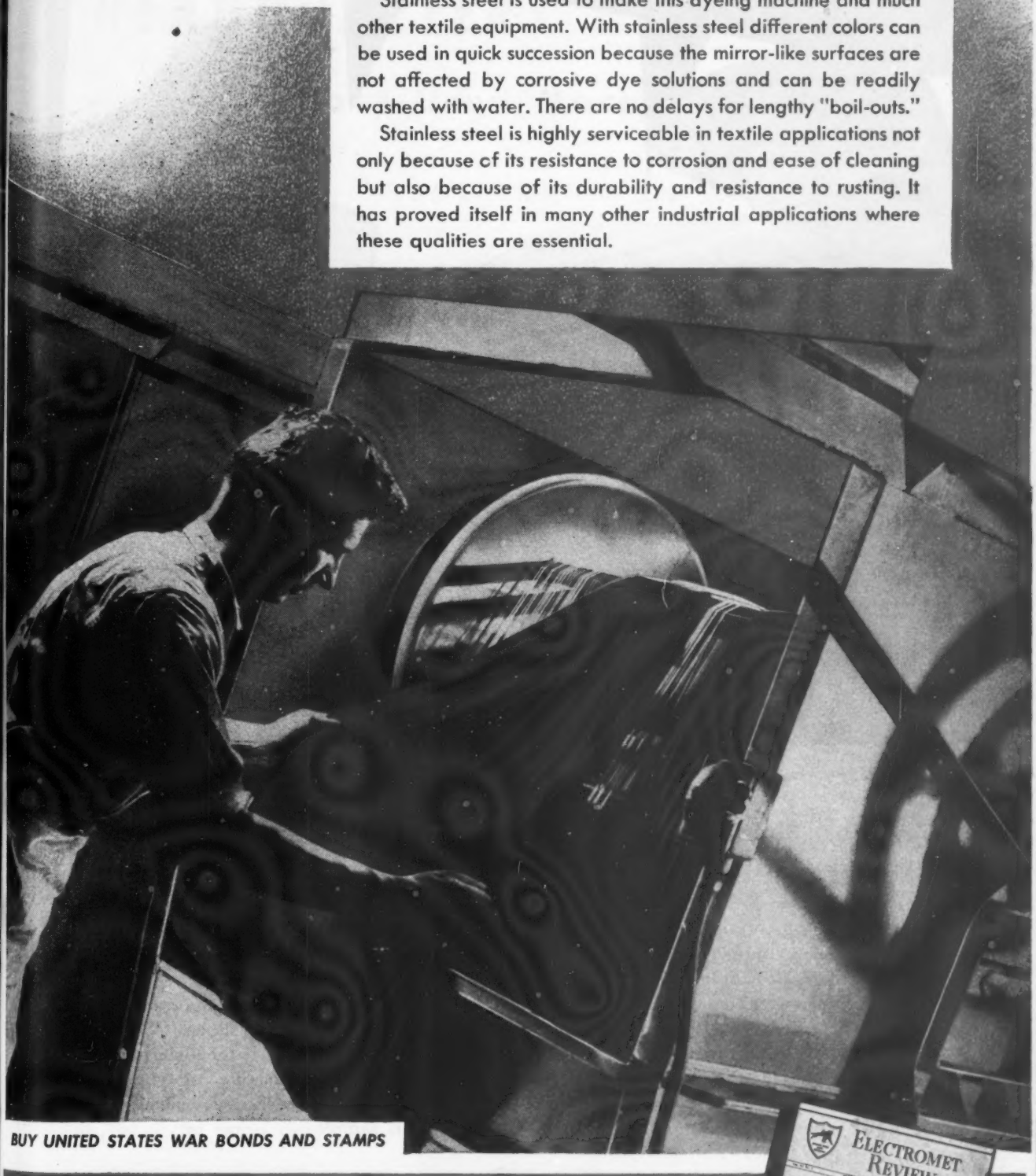
PRESSED METAL INSTITUTE

829 UNION COMMERCE BLDG. · CLEVELAND 14, OHIO

Many Colors in a short time

Stainless steel is used to make this dyeing machine and much other textile equipment. With stainless steel different colors can be used in quick succession because the mirror-like surfaces are not affected by corrosive dye solutions and can be readily washed with water. There are no delays for lengthy "boil-outs."

Stainless steel is highly serviceable in textile applications not only because of its resistance to corrosion and ease of cleaning but also because of its durability and resistance to rusting. It has proved itself in many other industrial applications where these qualities are essential.



BUY UNITED STATES WAR BONDS AND STAMPS

Other interesting uses of stainless steel are described in ELECTROMET REVIEW, published by ELECTRO METALLURGICAL COMPANY, the Unit of UNION CARBIDE and CARBON CORPORATION that produces alloys for making steel. If you are an executive, engineer, or designer you can be put on the mailing list for ELECTROMET REVIEW by sending your name on your business letterhead to ELECTRO METALLURGICAL COMPANY, Room 328, 30 East 42nd Street, New York 17, N. Y.

—Advt.

Presteel Solves a Problem for Typewriter Manufacturer

This manufacturer had always made its own stampings, and had tooled up to produce the steel ribbon cover shown above. Difficulty was experienced in providing enough metal for the rear overhang without wrinkling the top surface. So Presteel was called into the picture, and—as usual—solved the problem.

This manufacturer, incidentally, uses Presteel Cold Rolled Strip Steel for much of its own stamping production.

Few industries have not availed themselves of the services of the Worcester Pressed Steel Company. In all likelihood Presteel has contributed to the development of interchangeable parts for many of the machines in your own offices and shops. Why not investigate the possibilities for lowering costs and improving the quality of your own products by the use of Presteel metal stampings. Mail samples or prints to:

WORCESTER PRESSED STEEL CO.

406 BARBER AVENUE, WORCESTER 6, MASS.

ALLOY STEELS AND OTHER METALS COLD FASHIONED SINCE 1883

HEADQUARTERS FOR FACTS

about Used Machines

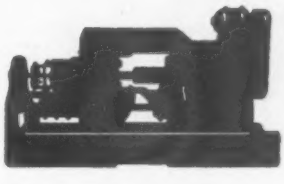
The value of a used Acme-Gridley Automatic as a production machine depends not on its catalog description, but on what it can turn out *today*.

For the facts, look to the men who design, build and tool these machines. They really know.

They can tell you if the "surplus" machine you might think of buying has been overworked or under-cared for. And whether it is a good buy at the reduced price, or at any price.

It pays to remember that the purchase price of any machine tool, old or new, must come back to you through production.

So, we urge you to seek competent advice before buying. Then buy a used Acme-Gridley *only* if it will help you reduce your cost of manufacture. Buy only machines that will improve your position, by cutting costs, in the highly competitive markets that are ahead.



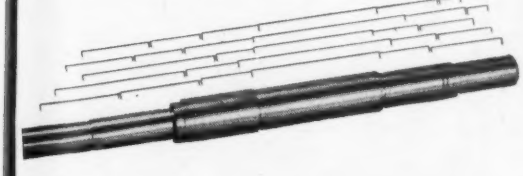
ACME-GRIDLEY BAR and CHUCKING AUTOMATICS

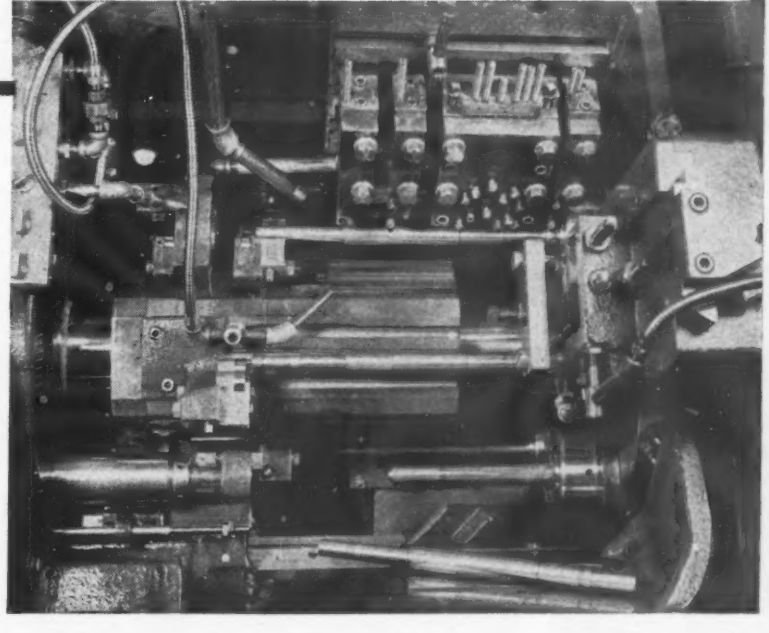
maintain accuracy of the highest spindle speeds and fastest feeds modern cutting tools can withstand.

A CASE OF COST REDUCTION

Acme-Gridley tooling makes it possible to machine all diameters of this motor shaft on one set-up, with high precision and concentricity. Time saved in set-up, in turning and investment—no one-purpose shaft machine to buy.

Sketch indicates the variety of shaft work that can be done with one set of tools, on the standard Acme-Gridley Bar Automatic.





THE NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

Your telephone might be like this!

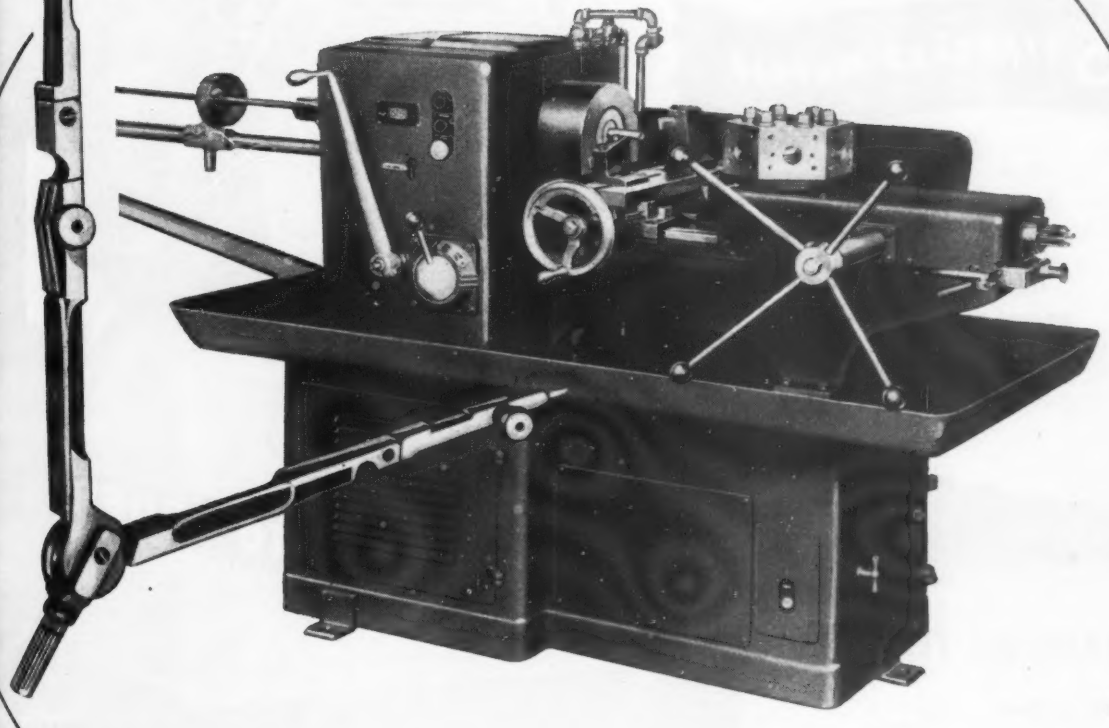
Simplification is the order of the day. A telephone to which you listen and into which you talk, without having to hold a transmitter, is a future possibility. Similar improvements will be made in many other familiar products, and you will see too, a great variety of new things. Many of these will call for wider use of the light alloys—aluminum and magnesium. Bohn engineering and research facilities will be at your disposal, in making the widest possible use in your products of the many sales and operating advantages of these light alloys.

BOHN ALUMINUM AND BRASS CORPORATION, DETROIT 26, MICHIGAN

GENERAL OFFICES—LAFAYETTE BUILDING

Designers and Fabricators—ALUMINUM • MAGNESIUM • BRASS • AIRCRAFT-TYPE BEARINGS

WIDER CIRCLE OF APPLICATIONS



Widely used in vital war production plants as a *SIMPLIFIED* lathe on numerous bar and chucking operations, the Oster No. 601 "RAPIDUCTION" is now developed to include a still wider circle of applications. Among these recent developments are the following:

1. New 4-speed motor permits four speed changes without change of sheaves. (2-speed motor optional.)
2. Motor is mounted on oil-resistant rubber to insure smooth, quiet operation.
3. Individual ⅛ H. P. motor now operates coolant pump to provide uniform flow of lubricant, independent of spindle speeds.
4. New electrical controls have speed selector switch located conveniently for the operator.
5. Increased rigidity of the machine is insured with longer base of heavier construction.

More than ever, the Oster No. 601 "RAPIDUCTION" lathe offers you "custom-built value" at an economical price. Optional WORM drive or DIRECT drive, as required. Six position turret is automatically indexed. Automatic chuck capacity 1½" round bar.

Inquiries are invited but deliveries are uncertain due to conditions beyond our control.

OSTER

"Rapiduction" LATHES

THE OSTER MANUFACTURING COMPANY • 2037 EAST 61ST STREET, CLEVELAND 3, OHIO, U. S. A.

UNITED

PORTABLE SHEARS

For Cropping and Dividing

5 STANDARD MODELS

Capacities to **2½"** *Square Hot Soft Steel at Temperatures from* **1200° F.** *to* **1400° F.**

SPECIAL DESIGNS TO ORDER

OUTSTANDING FEATURES

- **Low First Cost**
- **Rugged, Compact Construction**
- **Economical Maintenance**
- **All Mechanical Parts Fully Enclosed**
- **Furnished for Either Right Hand or Left Hand Operation**
- **May Be Used also for Cold Cutting Lighter Sections**
- **Occupies Only 24" x 24" Floor Space**

UNITED PORTABLE SHEARS are designed especially for uses where the need does not justify a large investment, but where production capacity is increased by having a small shear available.

More than 40 units are at present contributing to the economical operation of merchant mills in plants throughout the United States and foreign countries.

UNITED engineers will gladly recommend a suitable shear for *your* requirements. Consult us freely.

UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants in Pittsburgh · Vandergrift · New Castle · Youngstown · Canton

Subsidiary: Aetna-Standard Engineering Company, Akron, Ohio

Affiliates: Davy and United Engineering Company, Ltd., Sheffield, England; Dominion Engineering Works, Ltd., Montreal, P. Q., Canada

Builders of Reversing Blooming and Slabbing Mills and Auxiliary Machinery and Rolls and Rolling Mill Equipment

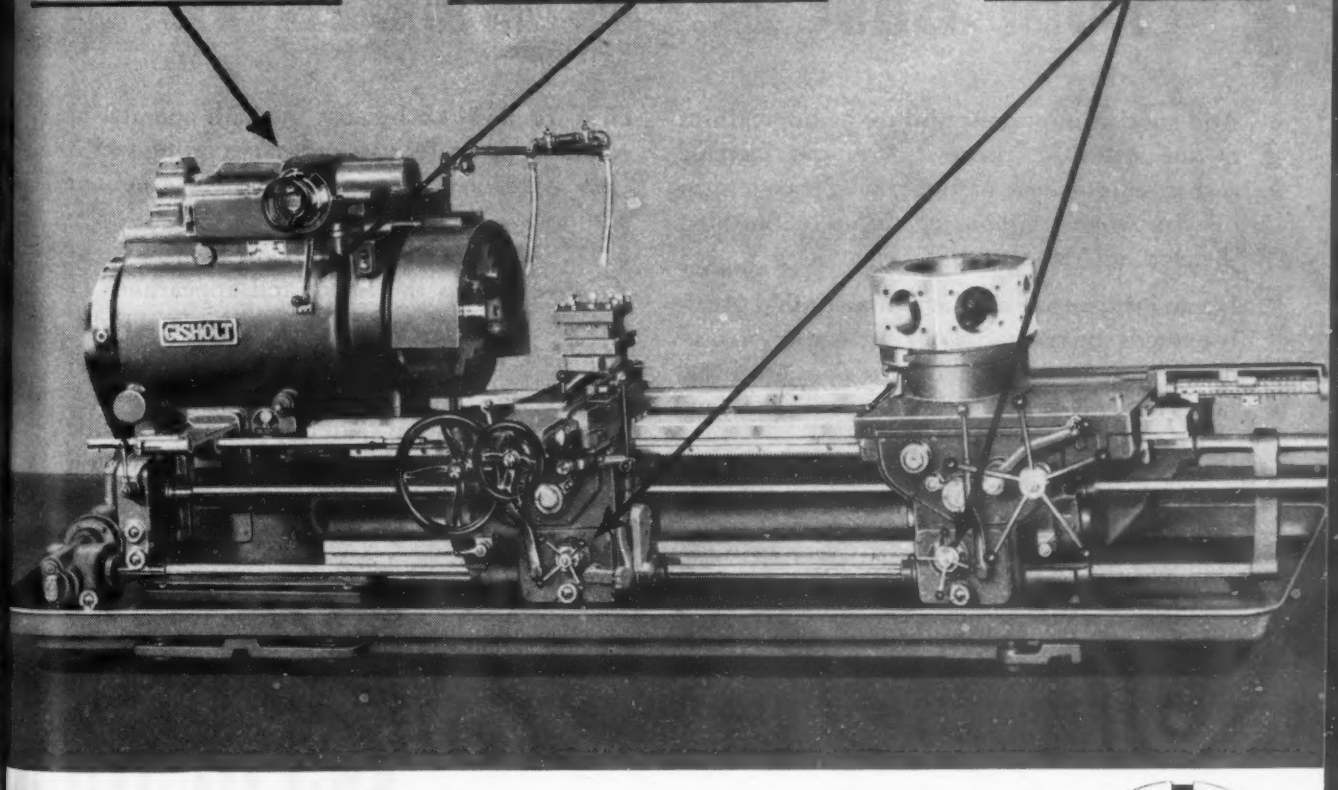
Easier Operation

HERE'S a 20,000-pound machine that requires no more operating effort than turret lathes approximately ⅓ its weight. Despite its great power and rigidity for heavy duty work, the new Gisholt 4L Saddle Type Turret Lathe is so fast and responsive it can handle light work of both large and small diameters. With many machine functions entirely automatic, waste time is eliminated. Fatigue is reduced to a new minimum. Training time is shortened. Operator output is faster—more nearly constant throughout the day.

1 Hydraulic speed selector eliminates manual gear shifting. Spindle speed changes are made instantly by power without stopping the spindle or releasing the main drive clutch. Can be operated either direct or pre-set.

2 Finger-tip touch to this single lever provides hydraulic control for starting, stopping, or reversing the spindle. No effort to it. Braking is automatic in neutral position, bringing the work quickly and smoothly to rest.

3 Easy selection of feeds is provided in the new single dial type feed selector control, making a complete choice of feeds immediately available. Aprons are fully enclosed. Automatic lubrication assures easy movement of carriage.



The new Gisholt 4L Saddle Type Turret Lathe provides 31⅜" swing over the ways; 27" swing over carriage wing and 63" longitudinal working travel of turret carriage to accommodate an unusually wide range of work. Ask Gisholt engineers about this modern, easier-operating Gisholt as applied to your specific machining requirements.

GISHOLT MACHINE COMPANY • 1217 *E. Washington Ave., Madison 3, Wis.*

Look Ahead...Keep Ahead...With Gisholt Improvements in Metal Turning

GISHOLT

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES • SPECIAL MACHINES

EXTRA CORROSION RESISTANCE

Applied Continuously to ZINC-COATED WIRE—STRIP—SHEETS

Your Best Bet is ANOZINC*

Add another important plus to the big features of the ANOZINC process! You can increase corrosion resistance of zinc-coated sheets, strip or wire *in a continuous operation* by finishing them in an ANOZINC bath.

It's an inexpensive anodic treatment that greatly extends the resistance of zinc coatings to outdoor exposure, aging and corrosion. Over 200 hours under A-N salt-spray tests prove that fact.

Here are other important advantages:

LOW COST because Anozinc salts are moderately priced; the operating cycle is short and standard drying procedures are used.

EASY TO HANDLE because one bath operates at room temperature; uses ordinary plating facilities; is readily maintained without frequent additions.

3 ATTRACTIVE COLORS to choose from:—Clear Anozinc retains the lustre and appearance of new zinc; Yellow Anozinc gives a brassy, slightly iridescent finish; Black Anozinc for a deep, rich black.

Wherever you want better appearance on zinc surfaces — or a better paint base — your best answer is ANOZINC. Write for further information, giving a brief outline of your application.

OTHER U.C. PRODUCTS AND PROCESSES TO SERVE YOU

CHROMIUM PLATING for wear-resisting, oil-retaining and other types of finishes.

☆**UNICHROME ALKALINE COPPER** for smooth lustrous copper plating in a non-cyanide bath.

☆**UNICHROME DIP** for increased corrosion resistance of zinc and cadmium—without electric current.

☆**UNICHROME STRIP** for speedy removal of copper, chromium, zinc, etc.

☆**UNICHROME RACK COATINGS**

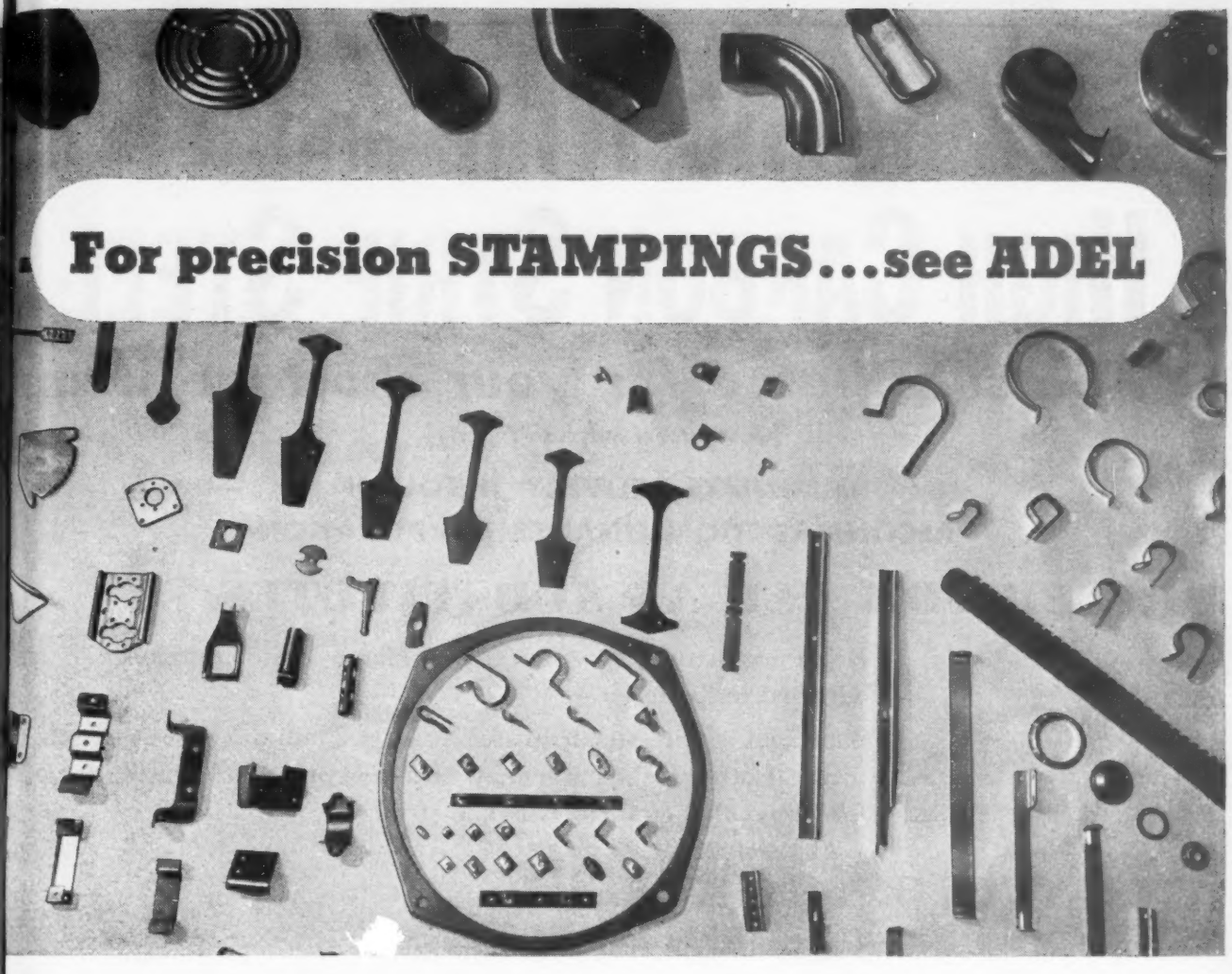
☆**UNICHROME STOP-OFF LACQUERS AND COMPOUNDS**

☆**UNICHROME Clear and pigmented LACQUERS**

☆**UCILON**—corrosion-resistant coatings for protecting surfaces against acids, alkalies, water, gasoline and various corrosive chemicals.

☆ Trade Mark U.S. Pat. Off.

UNITED CHROMIUM
INCORPORATED
51 East 42nd Street
New York 17, N. Y.
Waterbury 90, Conn. · Detroit 7, Mich.



For precision STAMPINGS...see ADEL

Just furnish the blueprints—and forget it. The job can be tooled, precision-stamped to close tolerances, heat treated, plated—and even assembled—with ADEL techniques which have been war improved to such production speed that your own product-assembly will move at a faster pace because of ADEL's all-around quick stamping service.

ADEL's batteries of punch presses (range up to 110 tons), and ribbon-forming machines have turned out over 250 million aircraft parts. Use these facilities, and ADEL *Design Simplicity* Engineering to tool, fabricate, process and assemble your parts all in one shop. ADEL plants are on either side of the country to provide speedy service to industry all over the U.S.A.

For stamping runs that are really fast, call an ADEL engineer at the office nearest you. It will be the first and only step you'll have to take to solve your stamping problems. **Write Dept. B-1**

ADEL PRECISION PRODUCTS CORP.

ADEL

Trade Mark

Burbank, Calif. · Huntington, W. Va.

Offices: **Seattle 1, Washington; Dayton 2, Ohio; Detroit 2, Michigan; Hagerstown, Maryland; Baltimore 1, Maryland; New York 20, N. Y.**
In Canada: Railway and Power Engineering Corporation, Limited

Copyright 1945 - ADEL PRECISION PRODUCTS CORP.

PRODUCTS OF *Design Simplicity* AND *Dependability*

The Aircraft and Transportation Division of ADEL manufactures precision controls for planes, boats, tanks, armament equipment. *Left:* ADEL "Mighty Midget" 4-way hydraulic selector valve. *Center:* ADEL Series "K" Fluid metering pump—outputs from .05 to 200 G.P.H. *Right:* ADEL *ISOdraulic remote control, remains syncronized from −65°F. to +160°F. *Trade Mark

MUSIC WIRE and HIGH CARBON STRIP STEEL

can be substituted for your shortage items!

(Government Surplus Property)

IMMEDIATE DELIVERY THROUGH
RECONSTRUCTION FINANCE CORPORATION

PRICED FOR USE AS SUBSTITUTES

Begin negotiations for your share in large available tonnage of music wire and strip steel.

Shortages of wire and strip steel have put mill deliveries well into the future. Both these items are now on sale at prices to permit substitution for many other grades of wire and strip.

A CONTINUING SALE

This continuing sale by Reconstruction Finance Corporation places at your disposal *new* music steel spring wire in excellent condition, and new high carbon, cold-rolled strip steel, in fair to good condition. The strip steel is in many gauges and widths, mostly in coils. The music wire is well-protected, and is available in various gauges, catchweight coils. Both classifications are priced for use as substitutes for many other grades of wire or strip. The music wire is located in Boston, New York, Philadelphia, Cleveland, Chicago, and Pacific Coast regions; the strip steel in the East and Middle West.

IT'S EASY TO BUY FROM RFC

Sales will be made direct to purchaser. Contact your nearest RFC Disposing Agency for complete information.

ASK YOUR NEAREST RFC DISPOSING AGENCY FOR INFORMATION ON AVAILABILITY OF CARBON BARS, ALLOY BARS AND TOOL STEEL

RECONSTRUCTION FINANCE CORPORATION

A DISPOSAL AGENCY DESIGNATED BY THE SURPLUS PROPERTY BOARD

Disposing Agencies at: Atlanta • Boston • Charlotte • Chicago • Cleveland • Dallas • Denver • Detroit Houston • Kansas City, Mo. • Los Angeles • Minneapolis • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle

BUY WAR BONDS

26

PORTRAIT OF PERFECTION

If it calls for precision handling, let McQUAY-NORRIS make it! Our knowledge of metals, our 35 years of experience in all phases of automotive precision-part making are the most versatile in the industry—and we love *tough* ones! Inquiries are welcome from any industry with peacetime plans.

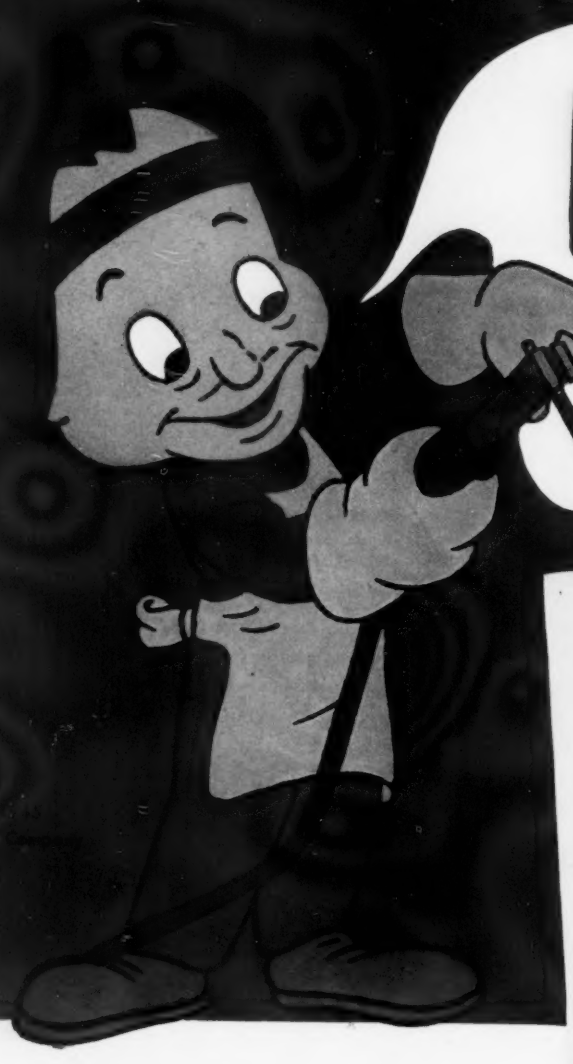
TIME TESTED McQUAY NORRIS AUTO PARTS PROVEN IN SERVICE

FOR INGENUITY IN PRECISION ENGINEERING . . . IT'S

McQUAY-NORRIS

MANUFACTURING COMPANY
ST. LOUIS, MO. . . TORONTO, ONT.

PRECISION WORKERS IN IRON, STEEL, ALUMINUM, BRONZE, MAGNESIUM



NOW TRY for FASTER,

A.W.S. CLASSIFICATION E6020/E6030

Welds made with W-27 electrodes meet these requirements.

1. **High mechanical properties**
2. **Rigid X-ray examination**
3. **Excellent profile appearance**
4. **Excellent surface appearance**
5. **High deposition rate**

●This new, heavily covered electrode—Type W-27—is specially designed for flat and horizontal fillet welding and flat groove welding at medium to high alternating or direct currents.

Proved by extensive laboratory and field tests, which have been confirmed by shop production data, the W-27 is the most advanced heavily covered electrode available for its particular applications.

Meeting A.W.S. E6020/E6030 requirements, this new electrode's stable, forceful arc produces deep penetration and a heavy slag, which completely covers the deposit, yet is easy to remove. Welds made with W-27 are outstanding in appearance and have ample margin over requirements of A.W.S. specifications.

For applications involving flat or horizontal fillet welding or flat groove welding, and capable of being fabricated at high currents, this electrode's higher melting rate allows faster welding—increases production.

Where heat input is a critical factor, the W-27's higher melting rate allows satisfactory welding speeds at less than normal current input. The work, therefore, shows less warpage and less crack sensitivity, and there is a marked reduction in locked-up stresses in deposited weld metal.

Since only its use in actual production will prove the value of any electrode, why not ask your G-E arc-welding distributor for samples of the W-27 and let your own operators be the judges. Your distributor can also provide you with more detailed performance data. Or, write to General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC

673-56-8743

OUR NEW W-27 ELECTRODE
BETTER FLAT AND HORIZONTAL WELDING

RANGE OF MECHANICAL PROPERTIES

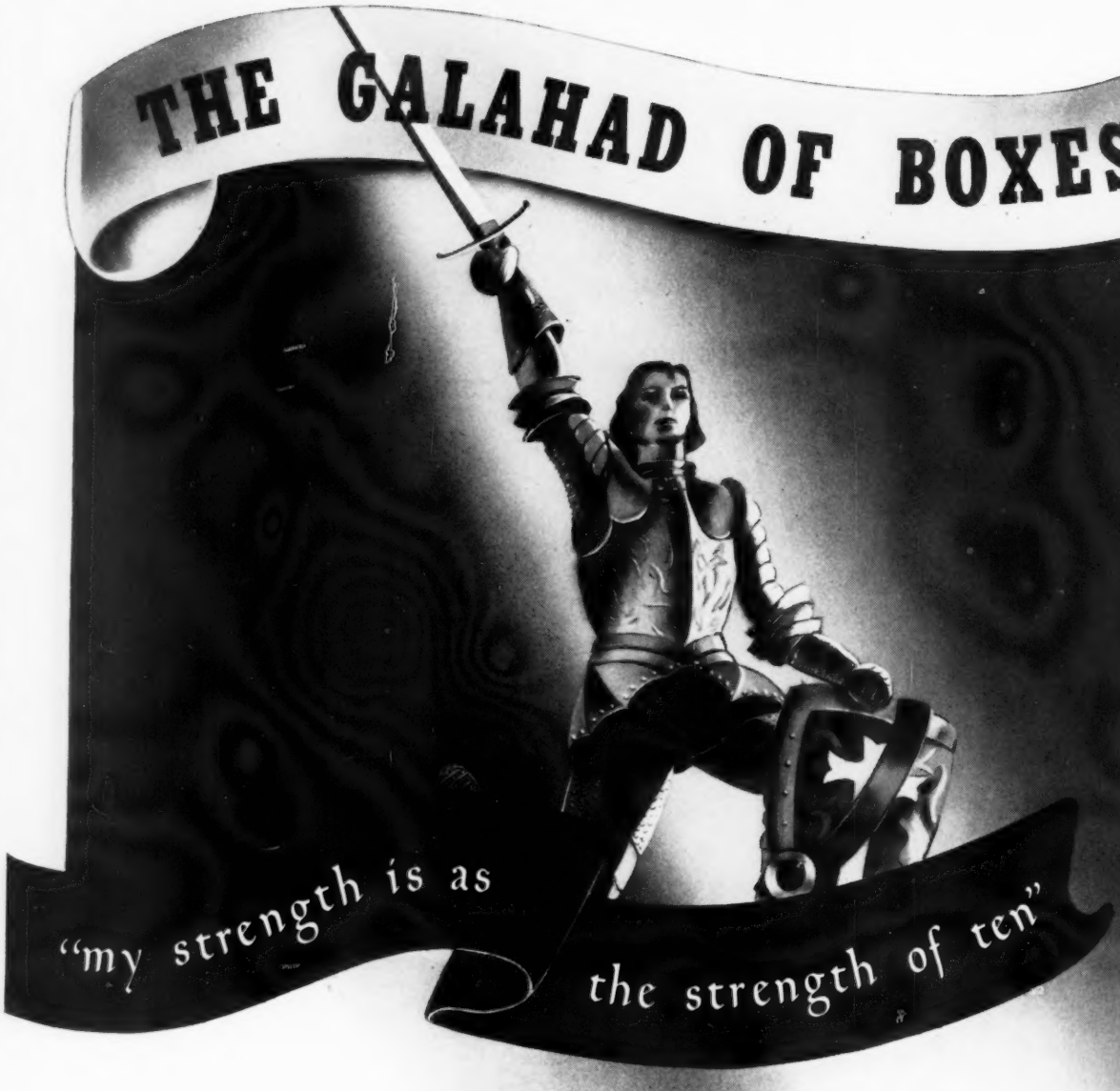
	As Welded	Stress Relieved
Tensile strength, lb per sq in...	63,000–68,000	61,000–65,000
Yield strength, lb per sq in....	53,000–57,000	47,000–52,000
Per cent elong. 2 in.....	27.0–32.0	32.0–38.0
Per cent reduction of area.....	54.0–62.0	60.0–66.0

Impact resistance ft-lb Izod	50–70
Endurance limit, lb per sq in.	30,000–34,000
Density, grams per cu cm	7.83–7.86
Brinell hardness	150–170

ARC WELDING ELECTRODES and EQUIPMENT

Buy all the BONDS you can
— and keep all you buy

THE GALAHAD OF BOXES



The first essential of your shipping container is strength—strength of design and strength of construction to guarantee maximum protection for your product at all times.

SUPERSTRONG Boxes and Crates—"Bound With Steel"—are tough, sturdy wirebounds built for strength. They have been tested and found worthy under the most trying conditions of war and peace.

For strength as well as for economy—it's SUPERSTRONG!

SHIPPING TRADE MARK SUPERSTRONG CONTAINERS

RATHBORNE, HAIR AND RIDGWAY COMPANY

1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS

THIS MATERIAL COMES WITH FOUR DIFFERENT KINDS OF RESISTANCE

It's Steel from the Republic Flat Rolled Line —made to resist heat, cold, rust, abrasion

Those are only a few of the characteristics of Steel that give Republic Flat Rolled Products the versatility to meet an exceptionally wide range of product and manufacturing needs.

The Republic Line gives you one source for flat rolled steel in *all analyses,* from plain carbon to stainless steel—*in all forms,* from narrow strip to 90-inch-wide sheets—*in all commercial finishes.* Whether your product requires corrosion-resistance or electrical properties—is deep drawn—must take a porcelain finish —or demands other special qualities, the material you want will be found in the Republic Flat Rolled Line.

Republic products fabricate easily and quickly by almost *any* method. They come flat or in coils, whichever is best for your production setup.

The vast research and engineering experience of a front rank steel producer, combined with the integrated control of a single organization, is your assurance of quality in Republic Flat Rolled Products.

For production or maintenance, you can get the materials you want for better performance and lower costs, if you choose from the Republic Flat Rolled Line.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Bldg., New York 17, N. Y.

Trade Names to Remember

TONCAN IRON
(resists rust and corrosion)

ENDURO STAINLESS STEEL
(corrosion- and heat-resisting)

ALDECOR — COR-TEN
REPUBLIC DOUBLE STRENGTH
(weight-saving, high strength steels)

TONCAN ENAMELING IRON
(easy to fabricate and enamel)

ELECTRO PAINTLOK
ELECTRO ZINCBOND
ELECTRO NEVAPEEL
(take paint readily—hold it)

TAYLOR ROOFING TERNES
(proved by 134 years' use)

REPUBLIC SILICON STEEL
(high-performance electrical steel)

EX-L-ITE TIN PLATE
(uniform high quality)

Republic

FLAT ROLLED PRODUCTS

SHEETS: Hot and cold rolled—carbon, copper-bearing, alloy and stainless steel—Toncan Iron—electrical, enameling, culvert, galvanized, galvannealed, electro plated, roofing, ternes, oven lining, bonderized. ● **STRIP:** Hot and cold rolled—coils and cut lengths—electrical, carbon, alloy and stainless steel—Toncan Iron. ● **PLATES:** Universal, mill edge, sheared—carbon, alloy and stainless steel—Toncan Iron—light armor. ● **TIN PLATE:** Coke and electrolytic—black plate and bonderized black plate—lacquered and coated in solid colors.

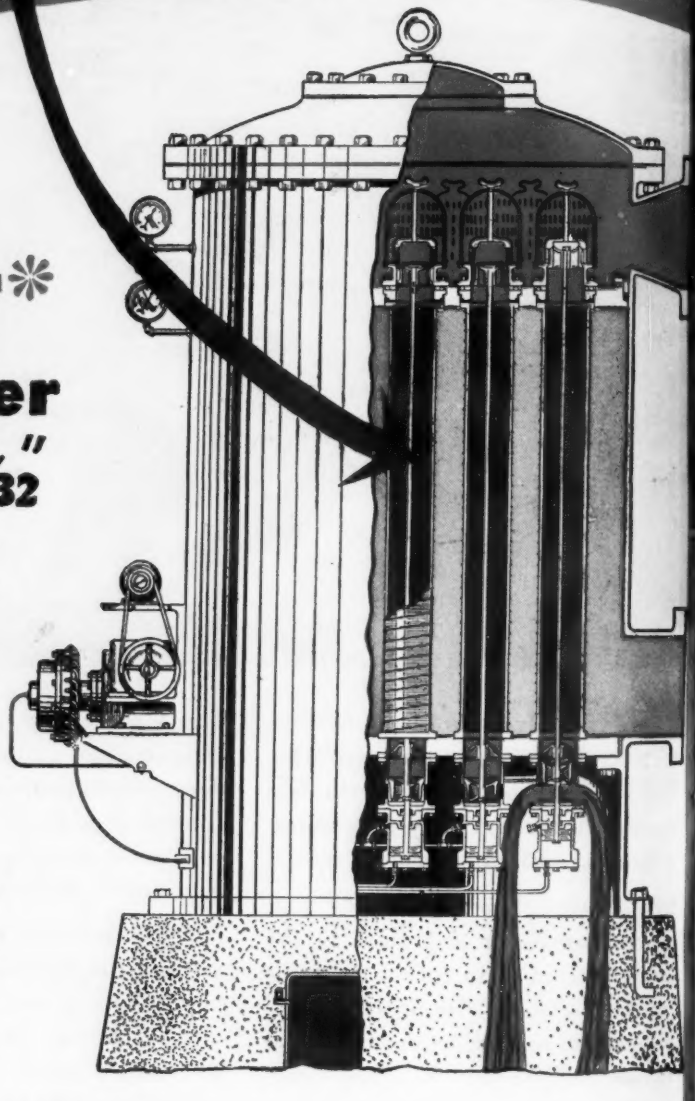
ADAMS AUTOMATIC WATER FILTERS

Remove GRIT and DIRT* from River Water

***15 times finer than 1/32"**

Adams *Poro-Screen* Filters offer a practical answer to large-scale filtration of dirty river water for use in hydraulic equipment. Designed for continuous, automatic operation and requiring a minimum of attention, Adams Automatic Filters supply the required volume of clean water for your operations—water free of dirt and grit which damage bearings, rolls, valves and other equipment. Highly successful on water cooling installations of open-hearth and heat-treating furnaces.

Adams Automatic Filters provide low velocity filtration. Their multiple tube design has no moving clearances, is fully automatic. One tube is back washed at a time while filter is delivering full rated capacity. Adjustable control gives flexibility of back-washing—excessively dirty water more frequently, normal water less frequently. Built in four sizes from 300 gpm. to 2000 gpm. Write for Bulletin 901.



★ R. P. ADAMS COMPANY, INC. ★

75 CHICAGO STREET, BUFFALO, N. Y.

ADAMS PORO-STONE AND PORO SCREEN FILTERS

Millions OF STEEL GAS CANS KEEP OUR BOMBERS ALOFT

ANOTHER of Germany's secret weapons has backfired, to speed up their own inevitable destruction. This is the "Jerri-can", or "Blitz Can"--an oblong, flat-sided, five-gallon, steel can for transporting gasoline. It is very strong and stacks or packs in small space.

America has made millions of these cans. For their manufacture, Youngstown has supplied literally miles of sheet steel with unusual deep drawing qualities. "Jerri-cans" full of gas were among the first supplies landed on D-Day in Normandy. They kept our tanks and trucks going in the sweep across France. Today they help keep our thousands of bombers and fighter planes aloft. American-made "Blitz Cans" are used in Italy, in India, Burma and China, and throughout the Pacific.

With overwhelming superiority in steel production, America and her allies can and will outbuild and outdo the Axis, on this small item or any other instrument of war. This superiority can win for us. How soon depends on how effectively we can and will bring superiority to bear on the goal of Military Victory. Then reconversion of steel to its constructive task of making the world a better place in which to live!

YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

YOUNGSTOWN 1, OHIO

Manufacturers of

CARBON - ALLOY AND YOLOY STEELS

Pipe and Tubular Products - Sheets - Plates - Conduit - Bars - Coke Tin Plate - Electrolytic Tin Plate - Rods - Wire - Nails - Tie Plates and Spikes

Snyder Special for BORING, FACING *and* TAPPING
Heavy-Duty Valves for Oil Fields

Machining valves to handle the oil that keeps our war machine running was slow and costly by conventional methods and called for skilled help which was hard to get. For one particular manufacturer of these heavy-duty valves, this Snyder special-purpose boring, facing and tapping machine solved these problems effectively.

Boring and facing is done with a four speed, single spindle head which is driven and advanced into the work by a Snyder self-contained hydraulic guide bar unit.

To the left of the operator and in front of one of the two boring units is installed a lead screw tapping device which has also a variable tool spindle speed. The entire tapping unit is mounted on a guide bar slide for hydraulic rapid advance.

Spindles are equipped with a breech lock and special tapered holes to make the exchange of tools quick and easy.

The index table is mounted on a manually operated elevating mechanism which compensates for the various sizes of work and also brings the tools concentric with the boss on the work-piece. This table is indexed for 180° with an intermediate index for the tapping operation.

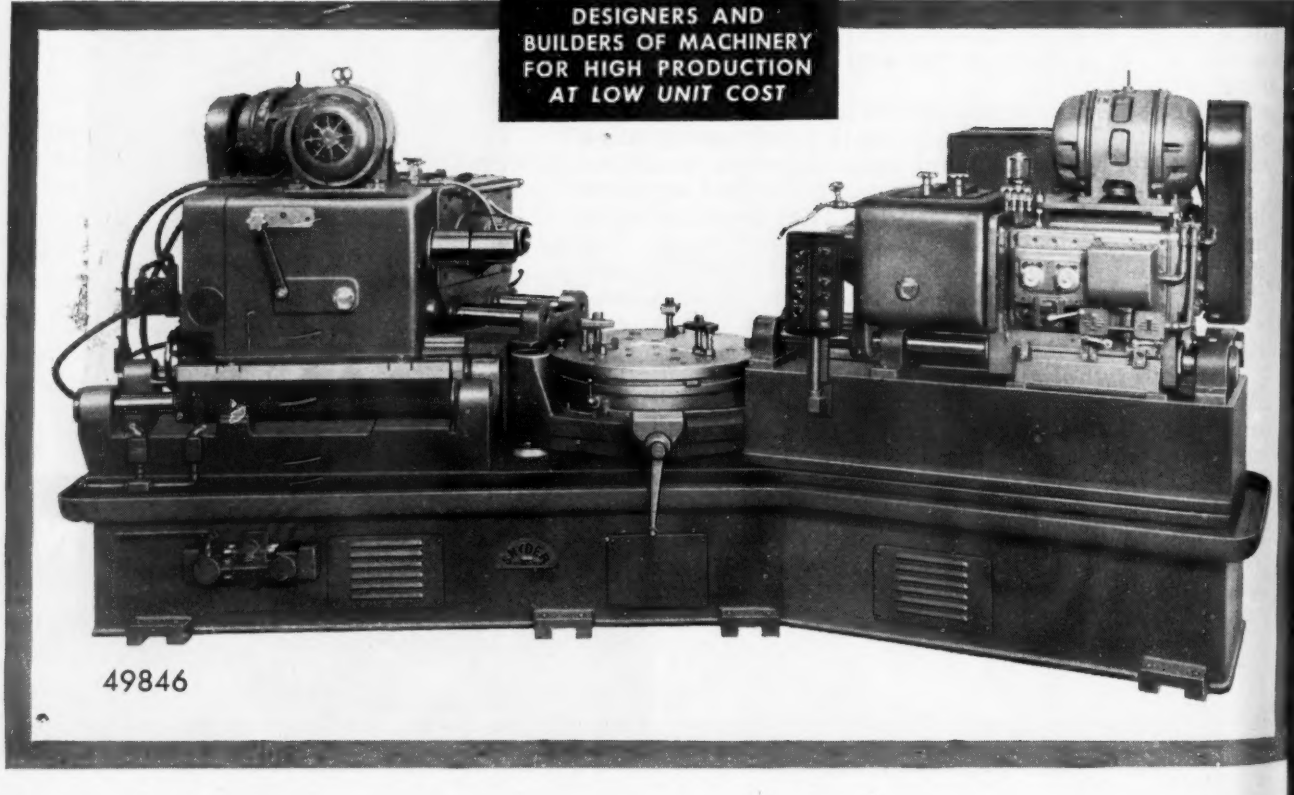
Although production in terms of units is relatively low, the savings accomplished by such machines are substantial. These savings affect time, handling, operator fatigue, operating skill, quality and uniformity of finish. Similar savings can be accomplished in the machining of other types of large, heavy parts.

If you are looking for ways to reduce the cost of any metal cutting operation it is likely that our experience as specialists in that field can be of considerable value to you. We invite your inquiries. *Snyder Tool & Engineering Company, 3400 E. Lafayette Avenue, Detroit 7, Michigan.*

20 Years of Successful Co-operation with Leading American Industries

SNYDER

DESIGNERS AND BUILDERS OF MACHINERY FOR HIGH PRODUCTION AT LOW UNIT COST



49846

GRINDING "MAGIC" FOR CARBIDE-TIPPED TOOLS AND DIES

You can now precision grind carbide-tipped tools and dies amazingly faster, cheaper with Por-os-way—without burning, without discoloring. Get the Por-os-way wheel with *green* silicon carbide, the wonder grit that's back from war. Try Por-os-way once and you'll use it always.

2 TO 5 TIMES LOWER GRINDING COSTS

IN SHOP after shop you hear enthused machinists passing along the good word about Por-os-way the sensational *open structure* precision grinding wheel that cuts hardest metals deeper, faster, *cooler*.

Men at the machines *ask* for Por-os-way.

They know how it rough grinds *and* precision finishes...with astounding speed...fewer rejects...and longer life. They know its amazing three-year war record first hand, and they've shared in its success.

When *you* ask for Por-os-way and put it to work you'll cut grinding costs 2 to 5 times, help keep war production up and make the boss happy. For *proof* of Por-os-way's results call in a Por-os-way engineer. He and Por-os-way will open your eyes to new feats in grinding! A. P. de Sanno & Son, Inc., 43 Wheatland Street, Phoenixville, Pa., Since 1893.

GROW with America! We can all earn more, buy more, have more after the war if labor, business and government are progressive, fair and cooperative.

*T. M. Reg. U. S. Pat. Off.

← **LOOK AT THE DIFFERENCE!**

Your eye tells you at a glance why Por-os-way is *different*. See the *extra porosity* that gives you over 8 distinct operating advantages!

RADIAC*

POR-OS-WAY*

The Precision Grinding Wheel

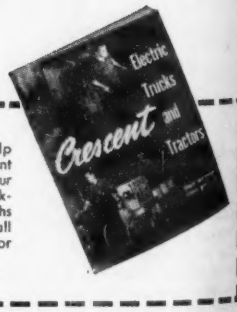
The Wheel That Costs The Most At First....Costs The Least At Last

POR-OS-WAY SEGMENTAL SURFACE GRINDING MEANS NO MOAN, NO GROAN, NO GRUNT! Give your surface and face grinding a BIG boost with Por-os-way segments. See how they cut faster, dig deeper... do it quietly by *cutting* the metal, not "scraping" the surface. No fuss, no racket and less time out for wheel dressing, too!

THE Crescent NCRE, shown above saving time and manpower for The Trailmobile Company, Cincinnati, O., is the most flexible of all lift trucks. The NCRE can be used for lifting, tiering or trailing. Equipped with a 62″ lift, it will operate inside any standard boxcar. Available in 4000-lb. and 6000-lb. lifting capacities.

Crescent *Electric* Trucks increase the speed of material handling and at the same time reduce labor costs because they effect drastic manpower savings. Careful designing and superior construction are responsible for their ability to withstand the hard usage they get these busy wartime days. Maintenance costs are negligible. Crescentize your plant and watch those handling headaches fade.

CRESCENT TRUCK COMPANY **1100 Willow St., Lebanon, Pa.**



FREE CATALOG to help you select the right Crescent *Electric* Trucks for your plant is yours for the asking. It includes photographs and specifications for all current models. Send for your copy today.

Crescent ELECTRIC TRUCKS AND TRACTORS

Industrial Truck and Tractor Specialists Since 1917

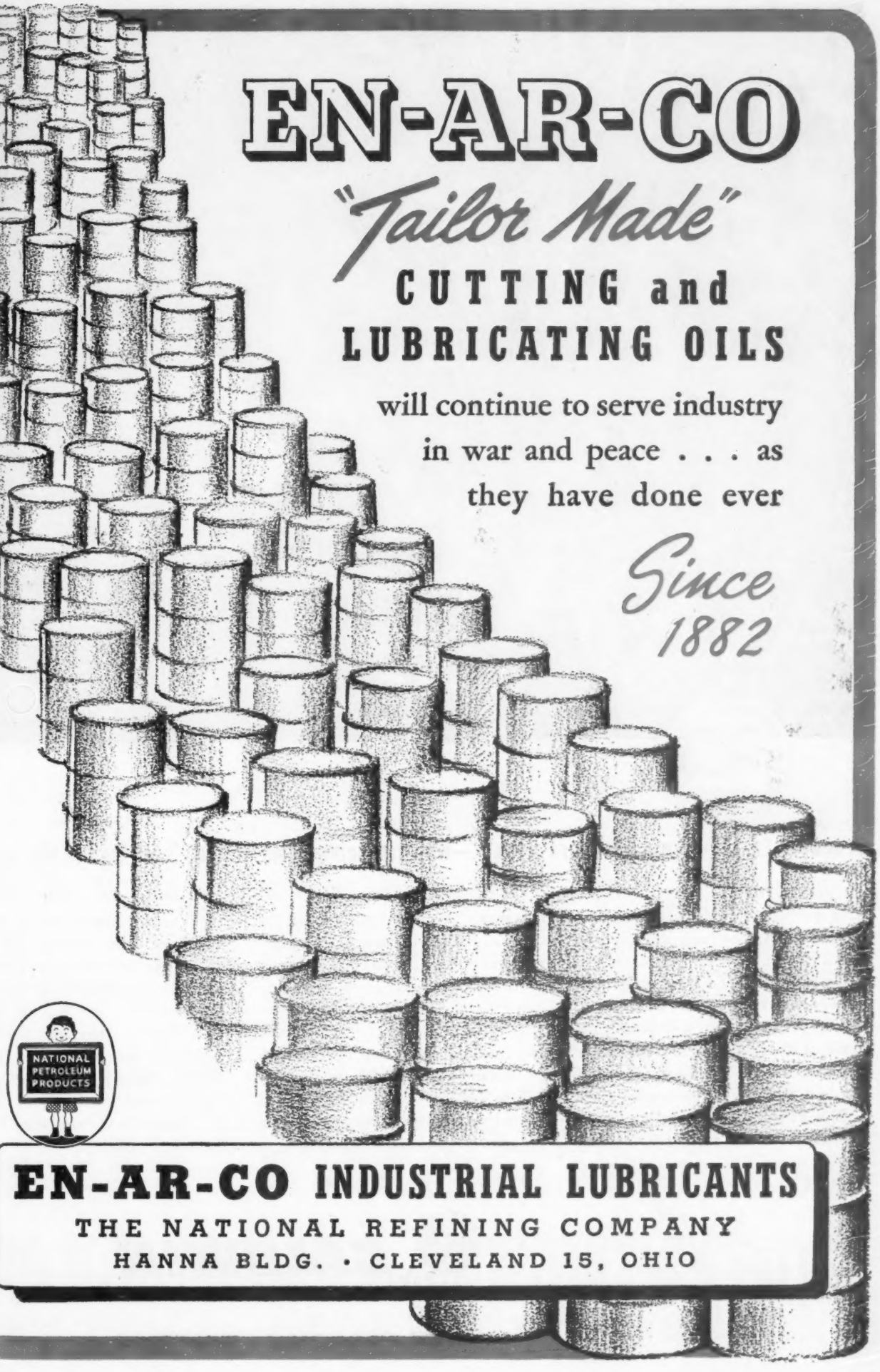
EN-AR-CO

"Tailor Made"

CUTTING and LUBRICATING OILS

will continue to serve industry in war and peace . . . as they have done ever

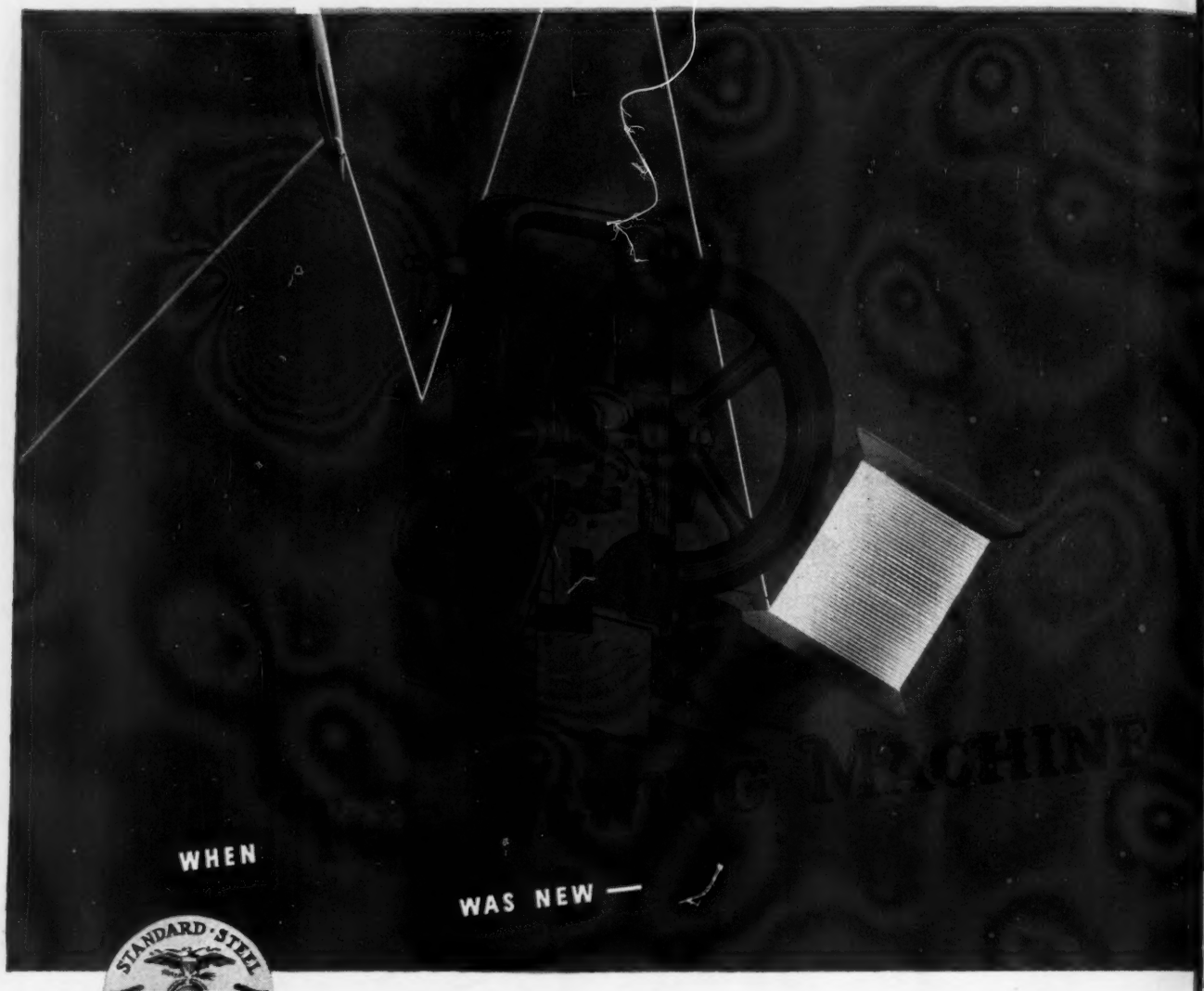
Since 1882



EN-AR-CO INDUSTRIAL LUBRICANTS

THE NATIONAL REFINING COMPANY

HANNA BLDG. · CLEVELAND 15, OHIO



STANDARD · STEEL
1795 1945
SESQVI · CENTENNIAL

Freedom Forge—now "Standard Steel"—was producing some of the "Best iron in the country"

This ancestor of today's sewing machine was invented back in 1850, and seems like an "old" development. Yet when it was new, Freedom Forge had already been an important iron supplier for 55 years and was producing some of the best wrought iron in the country, accepted as being equal to the best Swedish or Russian product.

The cold-blast furnaces used 205 bushels of charcoal per ton of iron, and refinement required 125 bushels of charcoal per ton of blooms. The charcoal was obtained from countless acres of forest, spread over adjoining mountain ranges. Metal was worked with 1,500-pound wooden helve hammers and four-ton cast iron helve hammers . . . advanced equipment for the day.

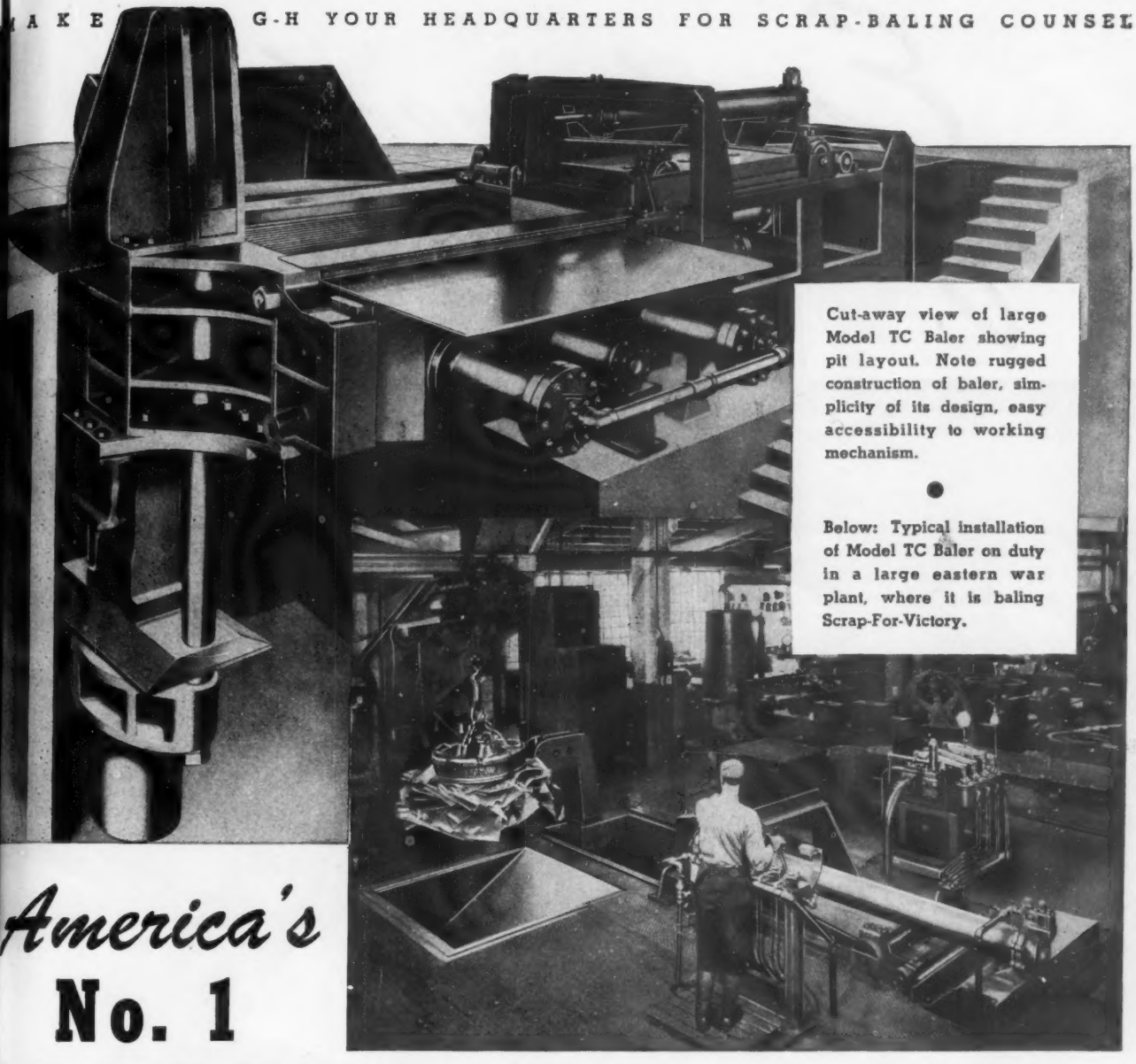
The 150-years of know-how that started with Freedom Forge is serving industry at the original location, in the Standard Steel Works at Burnham. Whatever your casting and forging needs, the best short-cut toward permanent satisfaction is to "Standardize on Standard." The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U. S. A. Offices: Philadelphia, New York, Chicago, Boston, Washington, Cleveland, St. Louis, San Francisco, Houston, Detroit, Pittsburgh.

BLW THE BALDWIN GROUP

BALDWIN

STEEL FORGINGS & CASTINGS

MAKE G-H YOUR HEADQUARTERS FOR SCRAP-BALING COUNSEL



Cut-away view of large Model TC Baler showing pit layout. Note rugged construction of baler, simplicity of its design, easy accessibility to working mechanism.

Below: Typical installation of Model TC Baler on duty in a large eastern war plant, where it is baling Scrap-For-Victory.

America's

No. 1 BALER!

FOR METAL WORKING PLANTS, SHEET MILLS, SCRAP YARDS

The G-H Model TC Hydraulic Triple Compression Baler is especially designed for efficient, high volume baling of bulky sheet scrap such as large industrial stampings and clippings, sheet mill trimmings, old auto bodies, fenders, drums and scrap wire. Because of its exclusive baling cycle, it compresses bulky scrap speedily without preliminary cutting or preparation . . . produces compact, high density, mill-sized bales at extremely low cost.

For further information on this powerful, skillfully engineered baling press, write for Bulletin 86-TC.

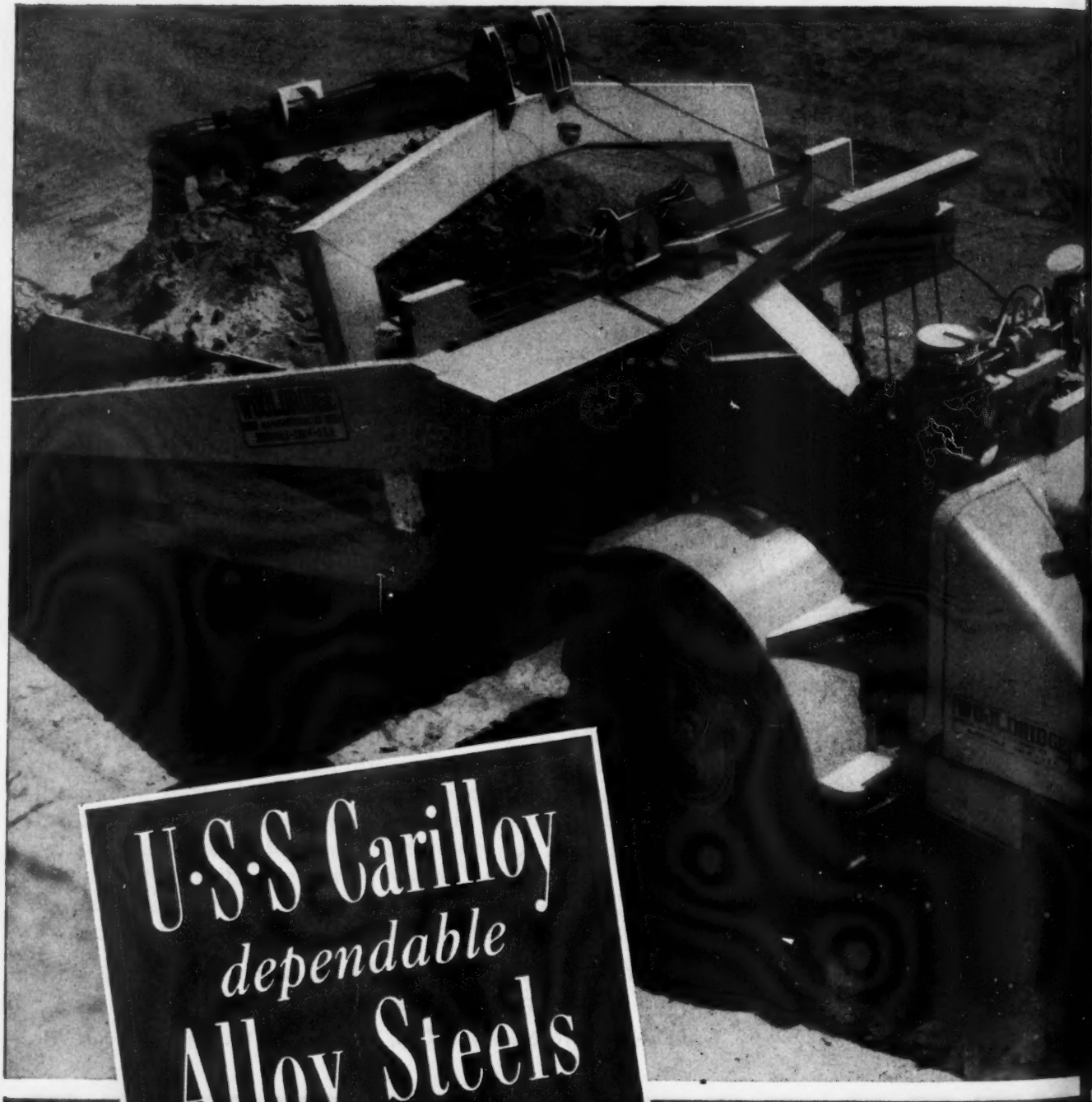
GALLAND-HENNING MFG. CO., 2747 S. 31st St., Milwaukee 7, Wis.

GALLAND-HENNING

SCRAP METAL BALING PRESSES

A 4611-1P-

Engineered for performance



U·S·S Carilloy
dependable
Alloy Steels

UNITED

VITAL PARTS THAT MUST STAND THE MOST GRIEF ARE MADE OF SPECIAL PURPOSE U·S·S CARILLOY ALLOY STEELS

CAPABLE of carrying full capacity loads of 18 cu. yds. at speeds up to 20 m.p.h., this recently developed, self-propelled, heavy duty scraper has been built to meet tomorrow's high-speed, low-cost earth-moving requirements.

Every part has been designed for maximum efficiency and for lowest cost performance.

For that reason, axles are made of U·S·S Carilloy Alloy Heat-treated Steel, side rail scrapers are of special U·S·S Abrasion Resisting Steel.

• • •

Wherever it is necessary to insure strength and safety, to provide superior resistance to shock and impact, to decrease weight, conserve space or to reduce maintenance, U·S·S Carilloy Alloy Steels are available to facilitate sound, economic engineering design.

U·S·S Carilloy Alloy Steels include Bearing Steels, Aircraft and Gun Quality Steels, Heat Resisting Steels, AISI, NE and Special Analysis Steels, as well as Nitralloy Steels, in all grades, in all finishes and in the widest range of sizes—produced either by Electric Furnace or Open-Hearth process.

Our unsurpassed facilities for on-the-spot rolling, finishing and heat treating permit us to furnish alloy blooms, billets and bars, slabs, plates, sheet and strip, as well as standard and special sections. Wide flexibility in furnace capacity makes it possible to handle, promptly, small orders as well as large.

U·S·S Carilloy Alloy Steels are produced by specialists who make fine alloy steels and nothing else—and whose aim is to give you the exact grade of steel that will do the best job for you at lowest cost. We welcome the opportunity to work with you.

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

USS STEEL — UNITED STATES STEEL

STATES STEEL

PAYROLL SAVINGS PLAN

NOW'S THE TIME FOR *Your* BIG "MOP-UP"!

RE-SOLICITATION is the keynote for a victorious "mop up" in the Mighty 7th War Loan. Bond rallies plus continuous competition between departments help to keep Bond subscriptions on a quota-topping climb. Strategic poster displays . . . showings of "Mr. & Mrs. America," the Treasury film . . . distribution of the War Finance Booklet, "How To Get There," and the handy Bond-holding envelopes play an important part. But, above all else, arrange to have every employee asked *once more*—and personally urged *once more*—to meet his personal quota in the Mighty 7th!

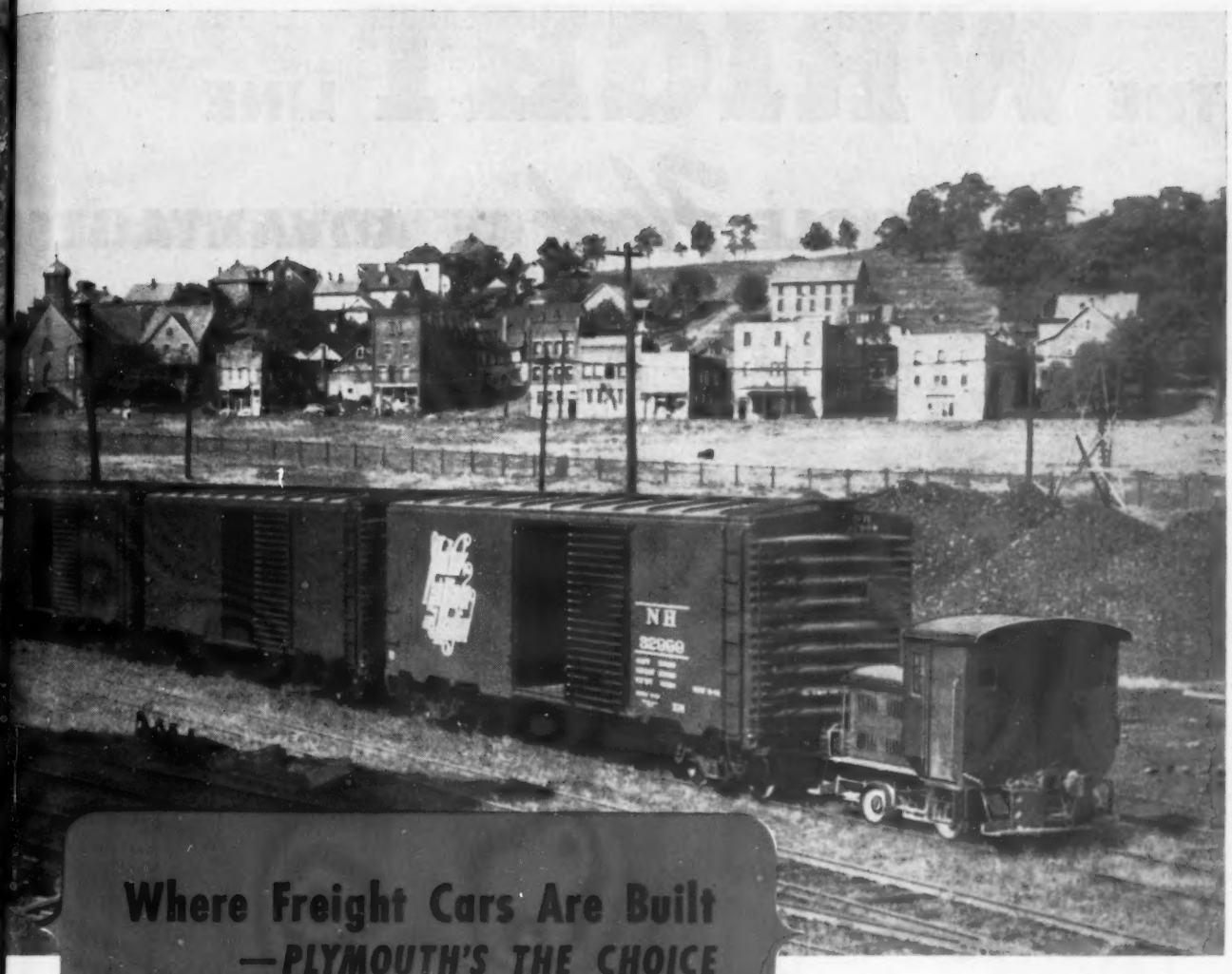
The Payroll Savings Plan is the mainstay of every War Loan—meeting your plant quota is vital to the success of the 7th! Remember we have to make two drives in 1945 do the work of three last year. Put on an intensive "mop up" final to help mop up the Japs, cut the tentacles of inflation—and lay the foundation of security.

THE MIGHTY 7th WAR LOAN

The Treasury Department acknowledges with appreciation the publication of this message by

STEEL

★ *This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council* ★



Where Freight Cars Are Built —PLYMOUTH'S THE CHOICE

Men who know railroading pick Plymouth for the tough jobs, like this one at the Butler, Pennsylvania plant of the Pullman-Standard Car Manufacturing Company. Working on a 54-hour a week schedule, this 12-ton, 100 h.p. gasoline-powered Plymouth switches cars from one department to another and moves loaded cars and empties in and out of the plant yards.

It's a hard grind, but a Plymouth can stand the strain of constant starting, stopping and switching. This one, for example, has a girder beam and bar sides frame, steel cast bumpers, straight air brakes and full-size, automatic couplers at front and rear. It's compact and maneuverable, but it's built to do the big jobs well.

Power and stamina, built into every Plymouth Locomotive, keeps them on the job, day after day. If you're looking for dependable, economical intraplant transportation, you'll want to know more about Plymouth.

TRACK HAULAGE IS CHEAPER HAULAGE

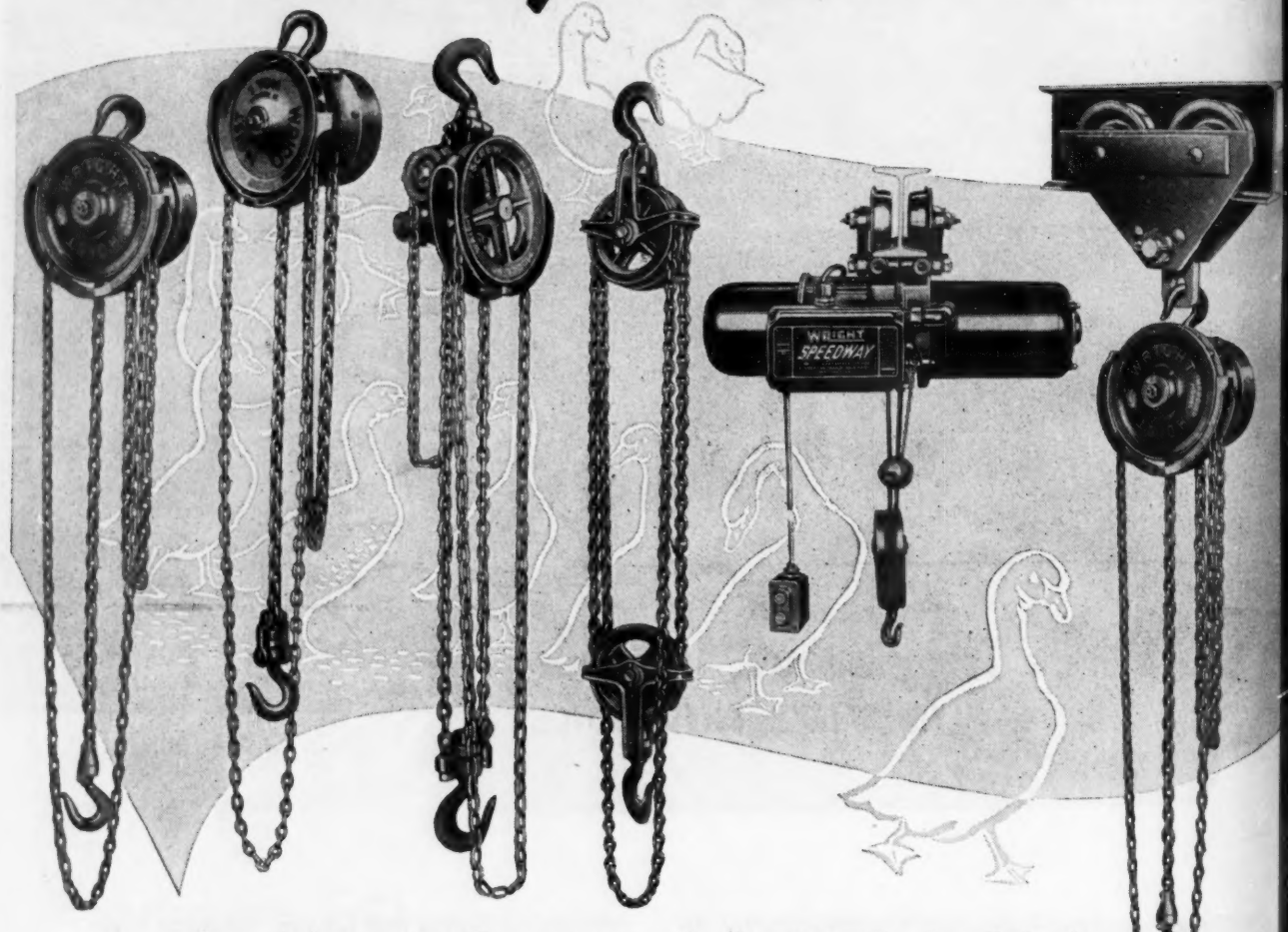
PLYMOUTH LOCOMOTIVES

GASOLINE, DIESEL, AND DIESEL ELECTRIC

PLYMOUTH LOCOMOTIVE WORKS • Division of The Fate-Root-Heath Co., Plymouth, Ohio, U.S.A.

THE WRIGHT LINE

HAS A WHOLE *Flock* OF ADVANTAGES!



● Every hoist, every trolley, every crane in the **WRIGHT** line has distinctive advantages for specific jobs. Indeed there are a whole flock of **WRIGHT** advantages, such as

1—Special analysis steel chain, electrically butt welded, heat-treated and proof-tested. Will not work harden.
2—Each link is gauged to fit pocket wheel. The chain is exceptionally high in tensile strength.
3—Non-fouling chain guide permits pulling of hand chain from any angle below hoist.
4—Planetary gear reduction of efficient and compact design.
5—Drop forged bottom hook from special analysis steel gives visible warning when overloaded through slowly opening without fracture, thus providing safe operation.
6—Precision ball bearings to increase efficiency and ease of operation.

Another **WRIGHT** advantage is engineering based on three principles: Safety, Efficiency and Economy. See your local **WRIGHT** distributor.

ACCO

TRADE MARK

York, Pa., Chicago, Denver, Los Angeles, San Francisco, Portland, New York, Bridgeport, Conn.

WRIGHT MANUFACTURING DIVISION
AMERICAN CHAIN & CABLE

In Business for Your Safety

You use high carbon heat treated
cap screws for a reason — *extra strength.*

CLEVELAND *Top Quality* 1035's

give you another extra — unusual
toughness added by the Kaufman
Process of manufacture.

CLEVELAND
Top Quality
FASTENERS

The Cleveland Cap Screw Company
2917 EAST 79TH STREET • CLEVELAND 4, OHIO
Warehouses: Chicago, Philadelphia, New York, Los Angeles
Ask your Jobber for Cleveland Fasteners

MADE BY THE ORIGINATORS OF THE KAUFMAN PROCESS FOR GREATER STRENGTH AND ACCURACY

FERRY CAP ★ PIONEERING ★

The First Company to Produce Cold Upset Connecting Rod Bolts

Diesel Freight Locomotive for the Burlington Lines.

Subjected to terrific punishment . . . FERRY CAP connecting rod bolts are one of the most vital parts of this modern Diesel Locomotive

MADE of nickel alloy steel, threads rolled or cut, and finished to extremely close thread and body tolerances—body ground where specified—these bolts are noteworthy for their strength, toughness, and precision—in brief, for their performance.

Ferry Cap—recognized pioneers in cold upset connecting rod bolts for American industry—was the first company to produce nickel alloy steel cold upset connecting rod bolts—the first to turn out rolled thread connecting rod bolts 15% to 20% stronger than threaded by other known methods.

Millions of Ferry Cap connecting rod bolts were used daily before and during World War I, and are used daily in the leading diesel, marine, jeep, truck, and tractor motors of the country in World War II.

The same skilled workmen who produce these outstanding connecting rod bolts produce SHINYHEADS—America's Best Looking Cap Screw—SHINYTHREADS—America's Leading Aircraft Engine Studs—and other Ferry Cap products. We shall welcome the opportunity to discuss your requirements with you.

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PAUL PUTS SPEED AND ACCURACY INTO YOUR PRODUCTION

ARMY E NAVY

6 plants of Blaw-Knox Company have been awarded the Army-Navy "E" for excellence

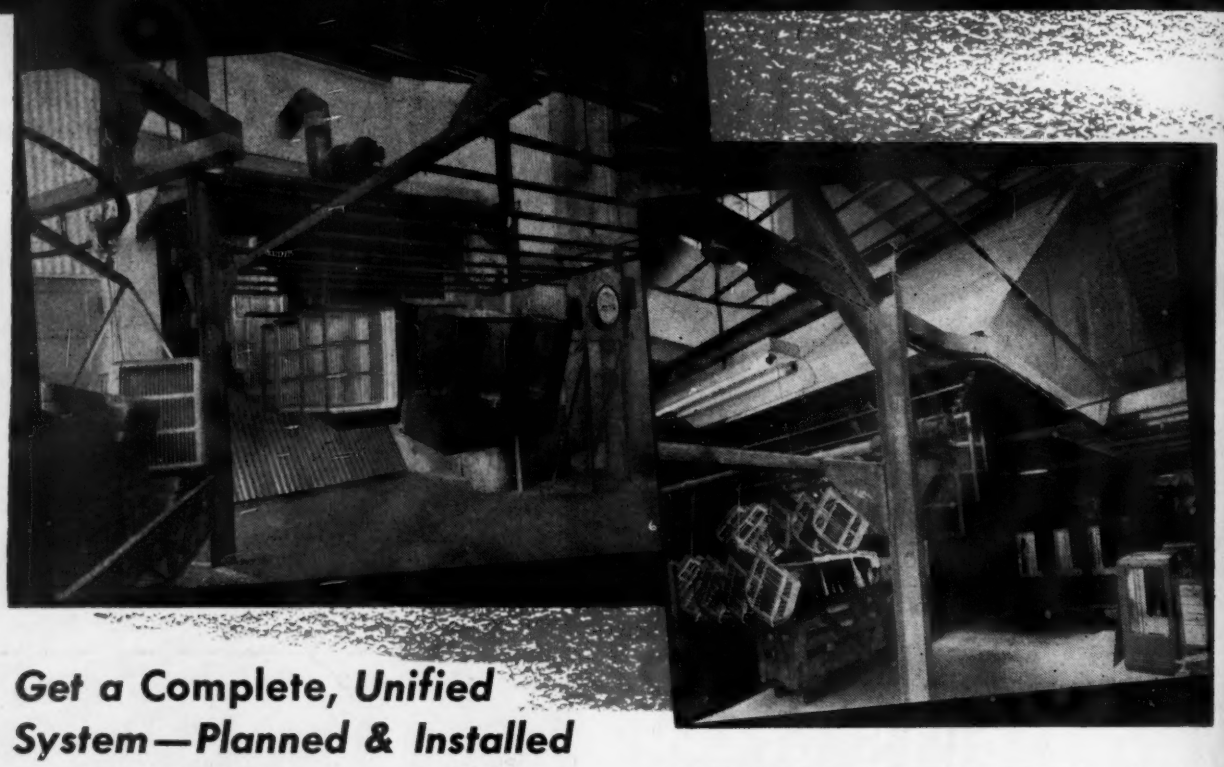
Like most of the top-notch machinists here, Paul Applegarth served his apprenticeship in the Lewis shops. His eighteen years experience in this specialized profession qualifies him as a past master at roll grinding . . . Just one of the factors responsible for the quality and reputation of Lewis Rolls.

Paul's second interest is the letters from his son, Don, now with the Army Air Corps in India.

LEWIS FOUNDRY & MACHINE . . . Division of BLAW-KNOX Company, Pittsburgh, Pa.

LEWIS ROLLS

How to Avoid Finishing Bottlenecks Through **DESPATCH ENGINEERING**



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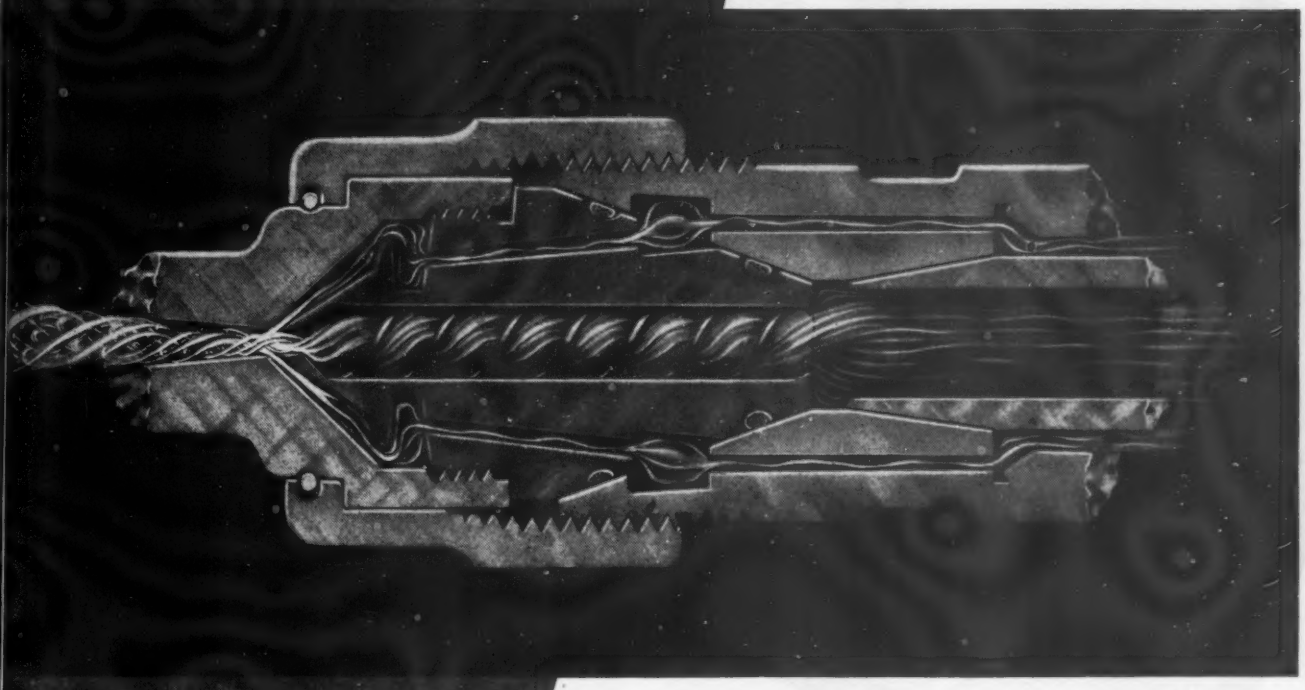
DESPATCH
OVEN COMPANY MINNEAPOLIS 14 MINNESOTA, U.S.A.

NO...This is not a robot bomb!



BUT IT SAVES YOU TIME AND MONEY!

Here is the most scientifically designed gas mixing device; incorporated into every VICTOR welding torch nozzle. Both oxygen and acetylene molecules are here thoroughly mixed; it controls ideal exit velocities. In short, it is the real reason why VICTOR welding or cutting torches are so free from annoying popping and back-firing—produce such ideal flame characteristics—stay on the job longer.

The VICTOR spiral mixer has made VICTOR torches the most economical to own and to operate.

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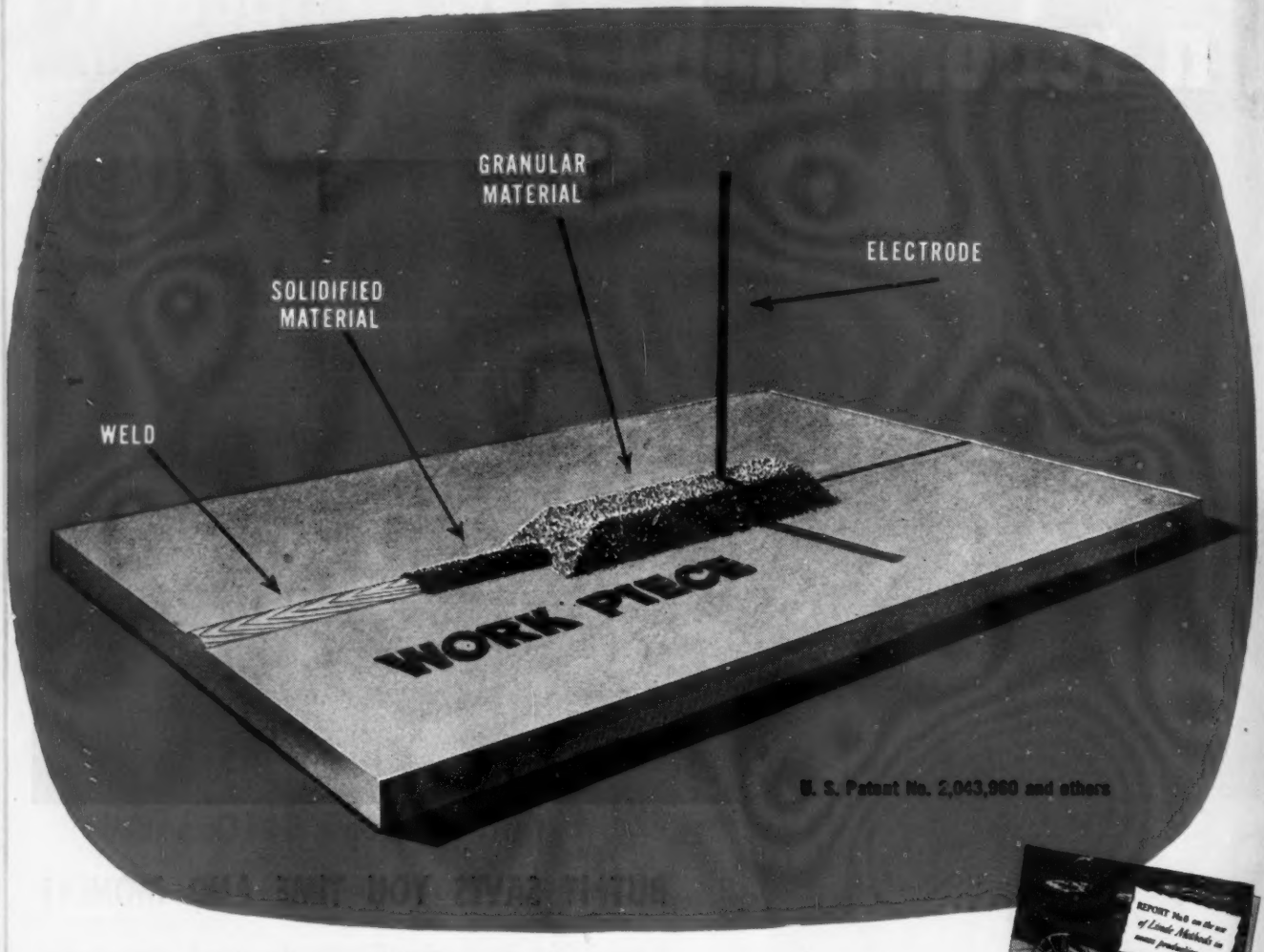
THIS IS UNIONMELT WELDING



UNIONMELT Welding is easy to recognize. It is electric welding done as diagrammed above—and it makes top quality welds at speeds that are greater than with any other similarly applicable process!

UNIONMELT Welding, a process of welding electrically beneath a mineral melt, has received wide application since U. S. Patent No. 2,043,960 was issued. It is the electric welding process that is rated by many as one of the most important factors in the great wartime fabrication of steel.

Anyone may obtain a license to use UNIONMELT Welding through its developers—The Linde Air Products Company.

Linde can supply a wide variety of equipment and materials to apply UNIONMELT Welding. Linde representatives can help you determine where you can use the UNIONMELT process advantageously and what type of equipment is best suited to your work.

REPORT No.6 on the use of Linde Methods in mass production...
UNIONMELT Welding—Linde's Automatic Electric Process Joins Metals Up To 20 Times Faster Than Other Methods Of Welding With Rod...

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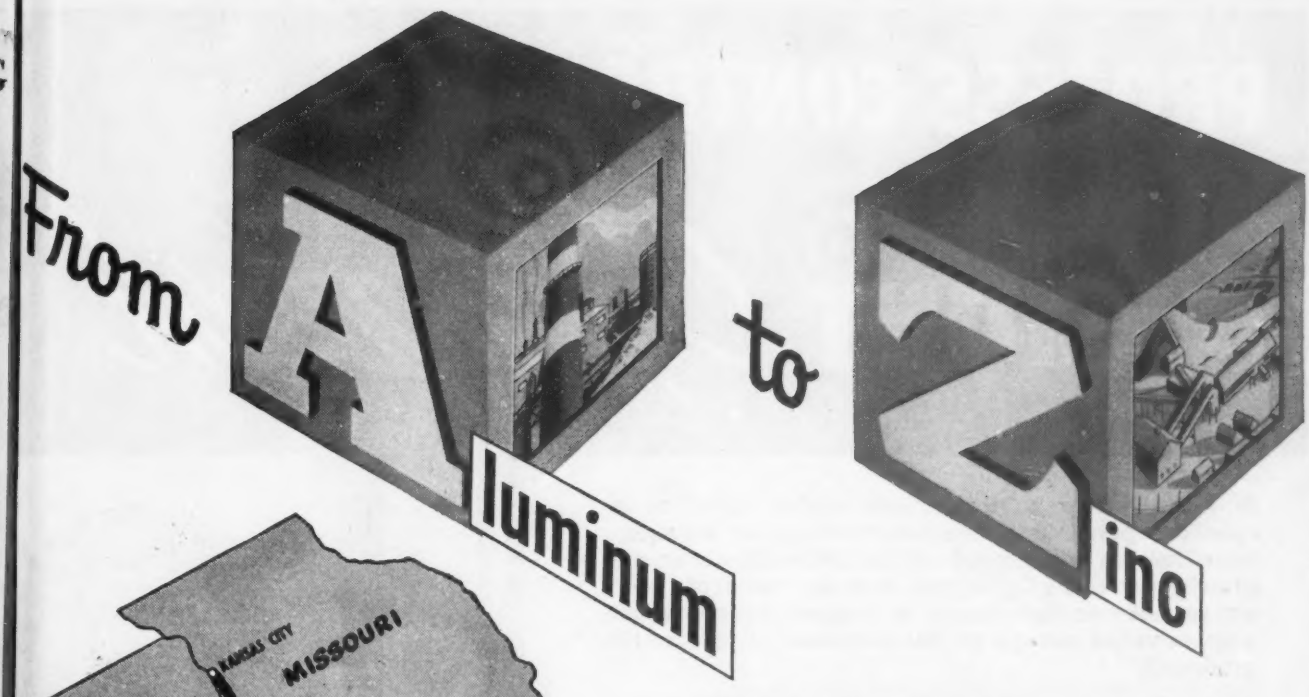

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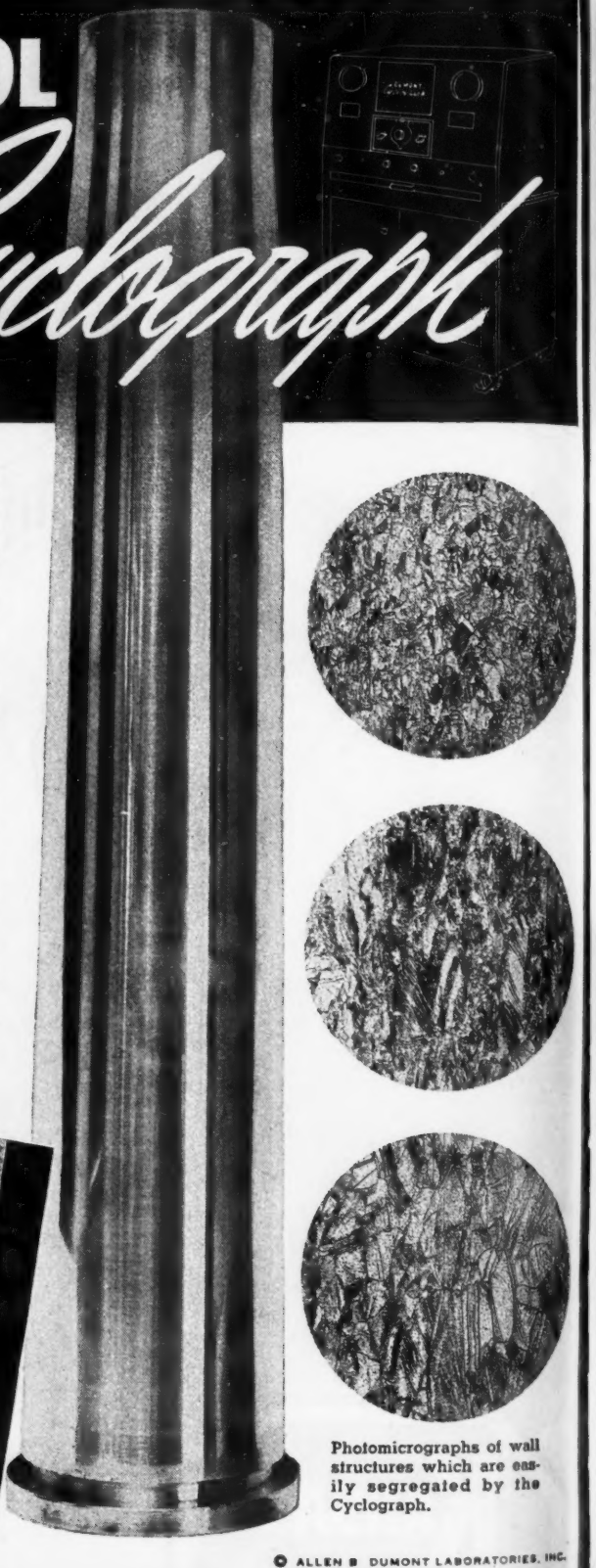
PROCESS CONTROL with the DuMONT *Cyclograph*

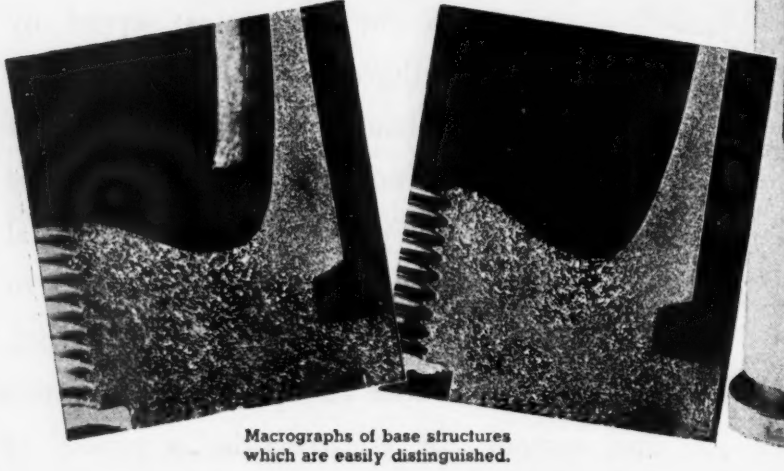


Most Cyclograph applications can be classed as inspection operations on finished products, or salvaging operations on mixed good and bad parts. However, one growing use of the Cyclograph is in the control of a process so that manufacture can be stopped as soon as the process varies enough so that unsatisfactory pieces are produced.

For instance, cartridge cases can be inspected during manufacture. Any wide variations in drawing or annealing practice which may affect the structure of the final case adversely, are immediately indicated and can be corrected before a large number of rejectable pieces have been made. The obvious savings in time and money from such a use of the Cyclograph, can be easily understood.

Some of the variations in structure in brass cartridge cases which can be easily detected, are herewith illustrated. The Cyclograph can be applied in the same manner to a wide variety of manufacturing processes for munitions and all types of metal parts.

Write for Literature . . .



Macrographs of base structures which are easily distinguished.

Photomicrographs of wall structures which are easily segregated by the Cyclograph.

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Turning on the heat...for *Quality*

illustration above is Copperweld's 24" Mill Heating Furnace. The heating chamber is 60 feet long and 22 feet wide and has a 50 ton per hour capacity. It may be fired by either gas or oil.

Such equipment and care are typical of every operation in making ARISTOLOY Steels. That's why ARISTOLOY has earned the enviable reputation of "TOPS" in electric furnace steels.

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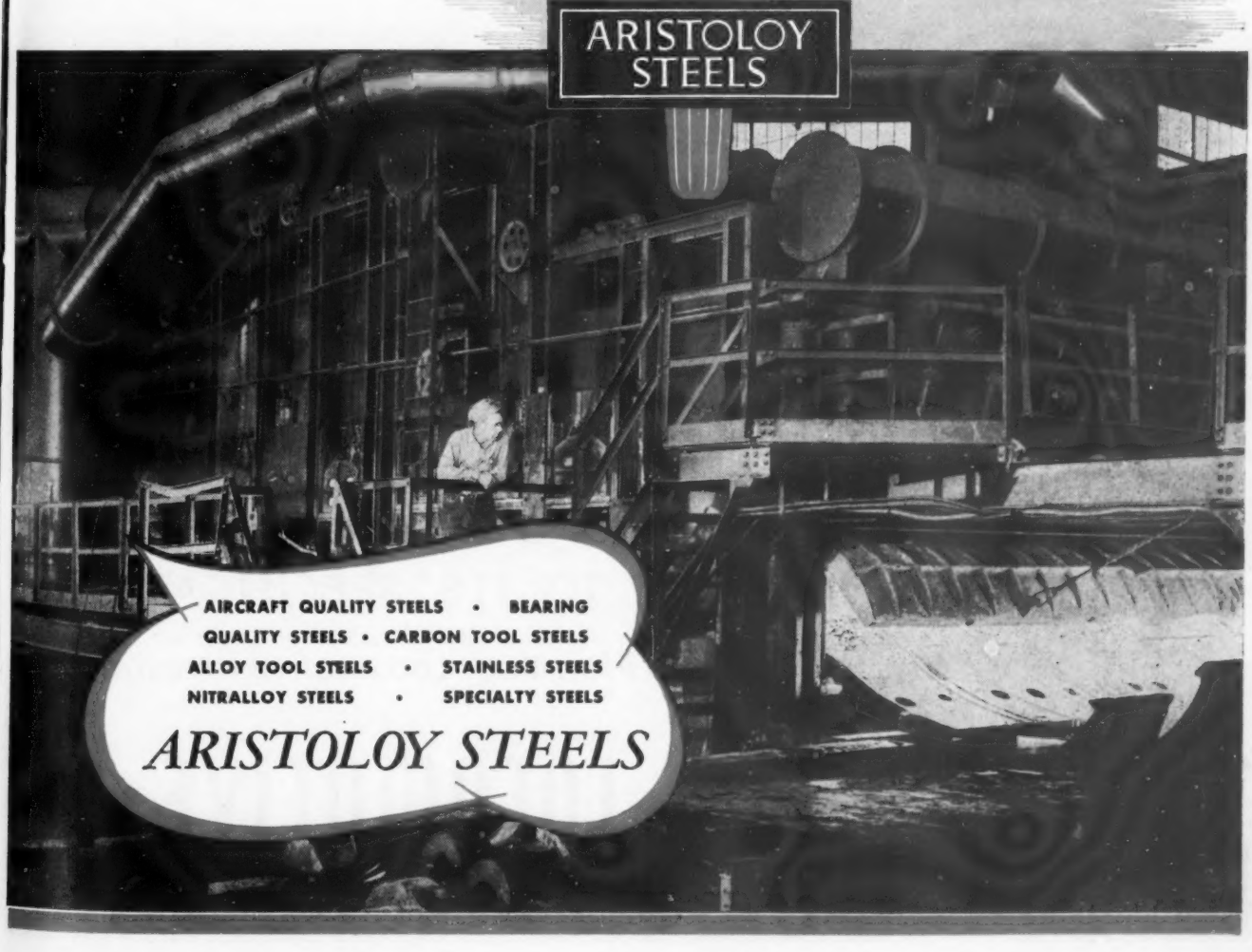
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No. 2 Now in Service

1943 Rustless Iron & Steel Company placed in service a Whitcomb 12 ton gasoline mechanical locomotive to convey charging cars from the scrap yard to the melting department.

1945 Number 2 placed in service to transfer heats of steel from the melting department to the reheating furnaces of the rolling mill. The unit is identical to No. 1 except it is designed with clearance limitations to operate through a low and narrow tunnel.

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THE WHITCOMB LOCOMOTIVE CO.

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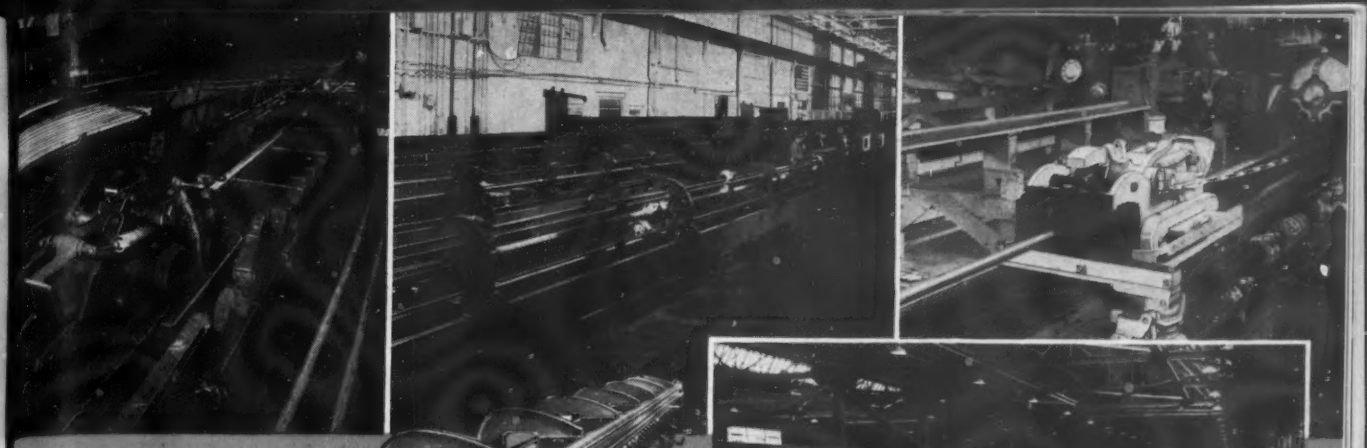
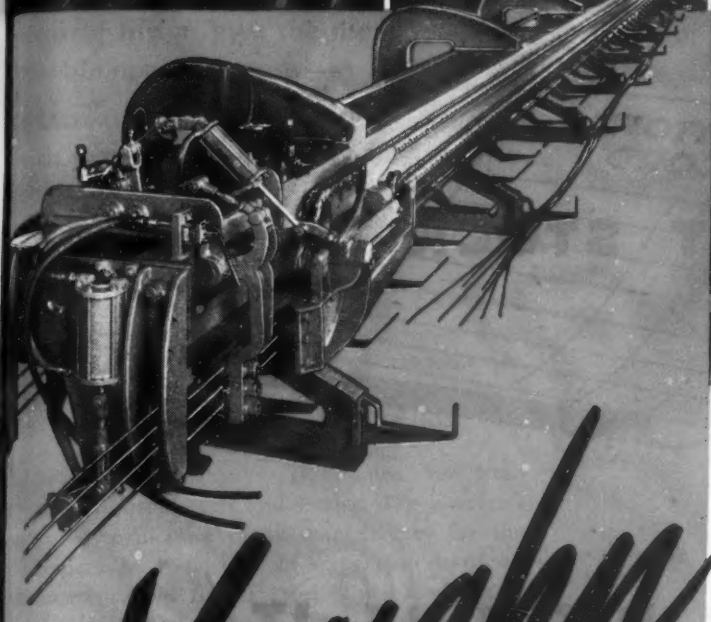
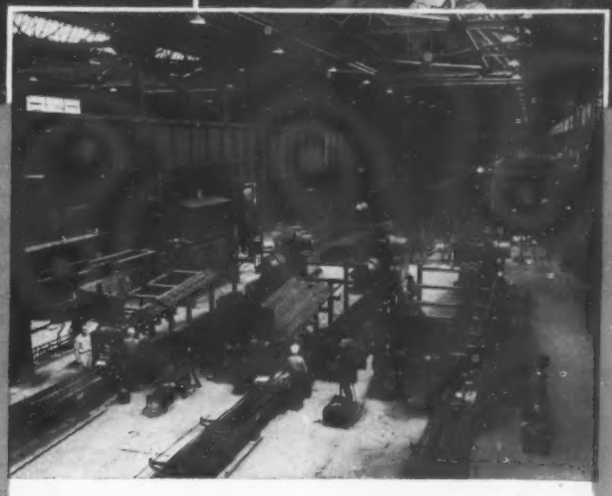




Vaughn



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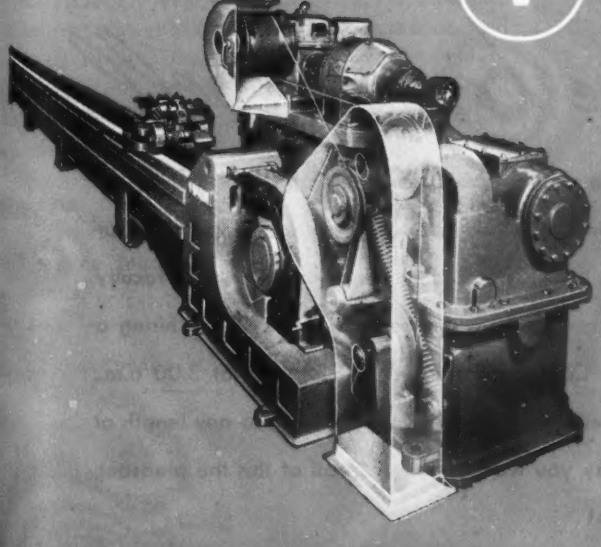

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1 Speed up production and reduce costs with the Limitrol. The Limitrol Comparator Type Snap Gage checks errors involving pitch diameter, lead, taper, angle, out-of-roundness. It eliminates "feel" and reduces scrap. Write for Folder 44-L.

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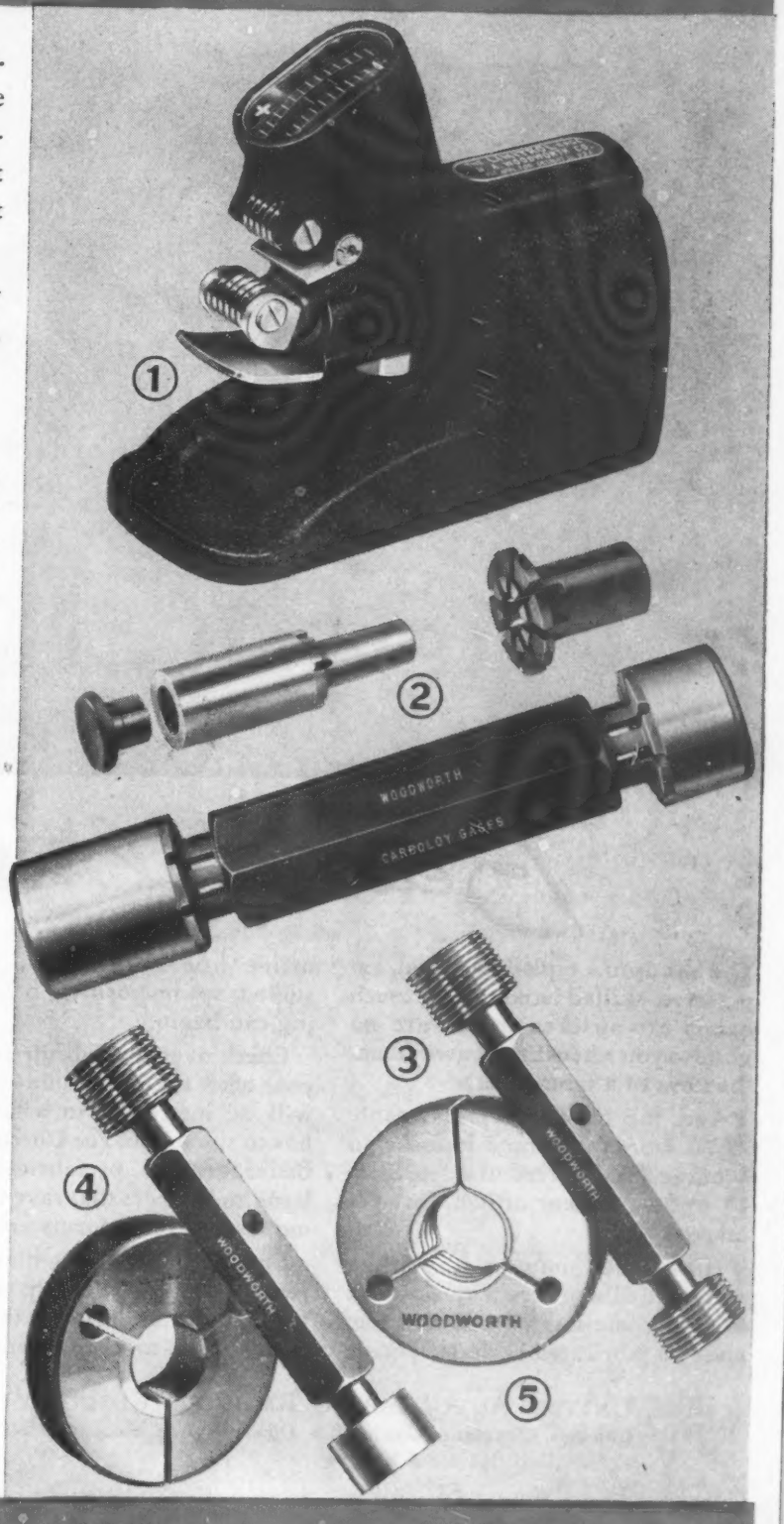

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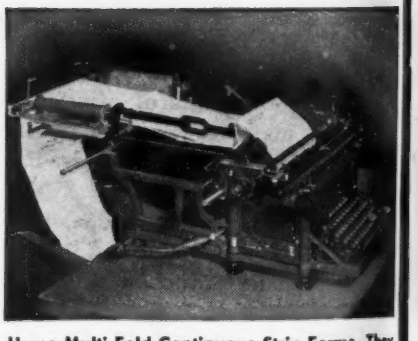

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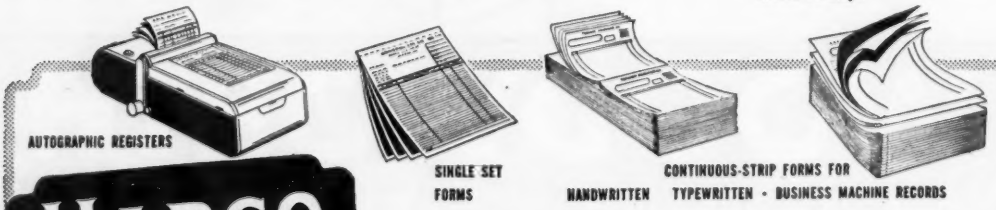
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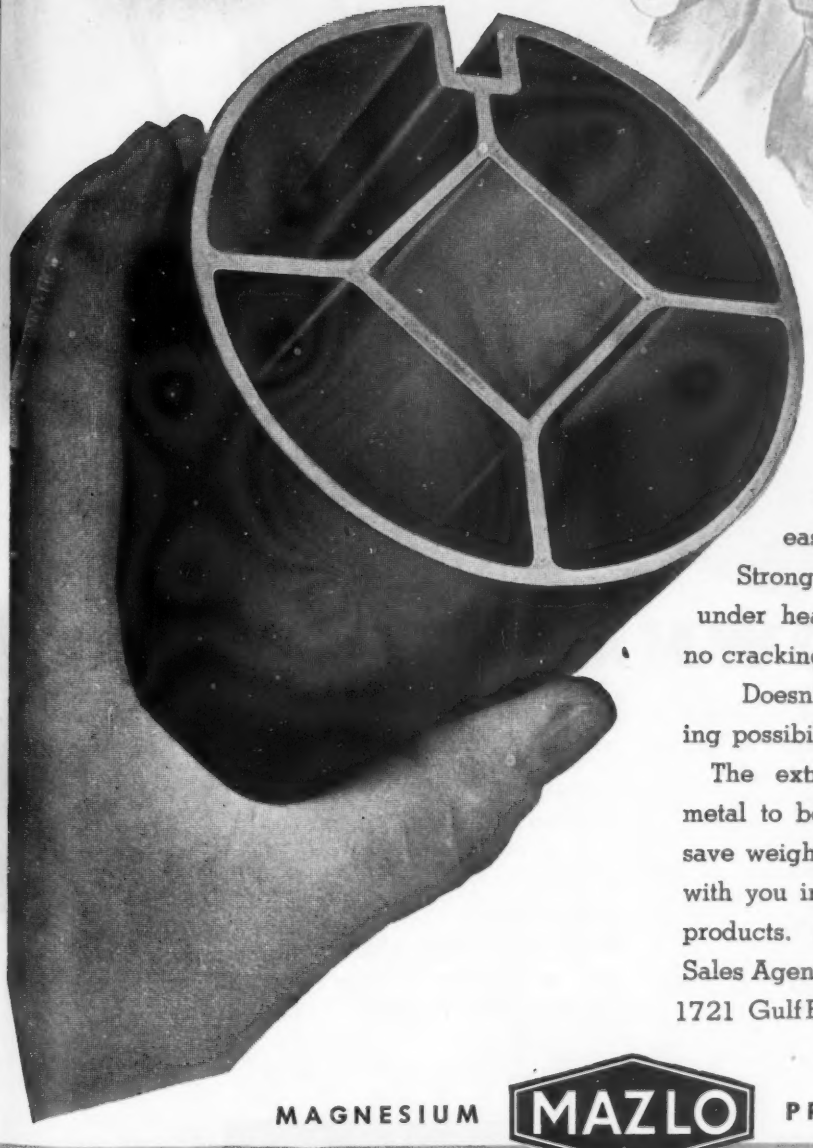
THINK IN TERMS OF MAGNESIUM

consider this extruded shape, for example



• This hollow extruded magnesium shape was designed by American Magnesium to give the textile mills a better cloth roll. It has a degree of permanence never before attained. Light in weight, these rolls make handling easier, simplifying a labor problem. Strong and stiff, they're able to stand up under heavy loadings. There's no distortion, no cracking, no splintering.

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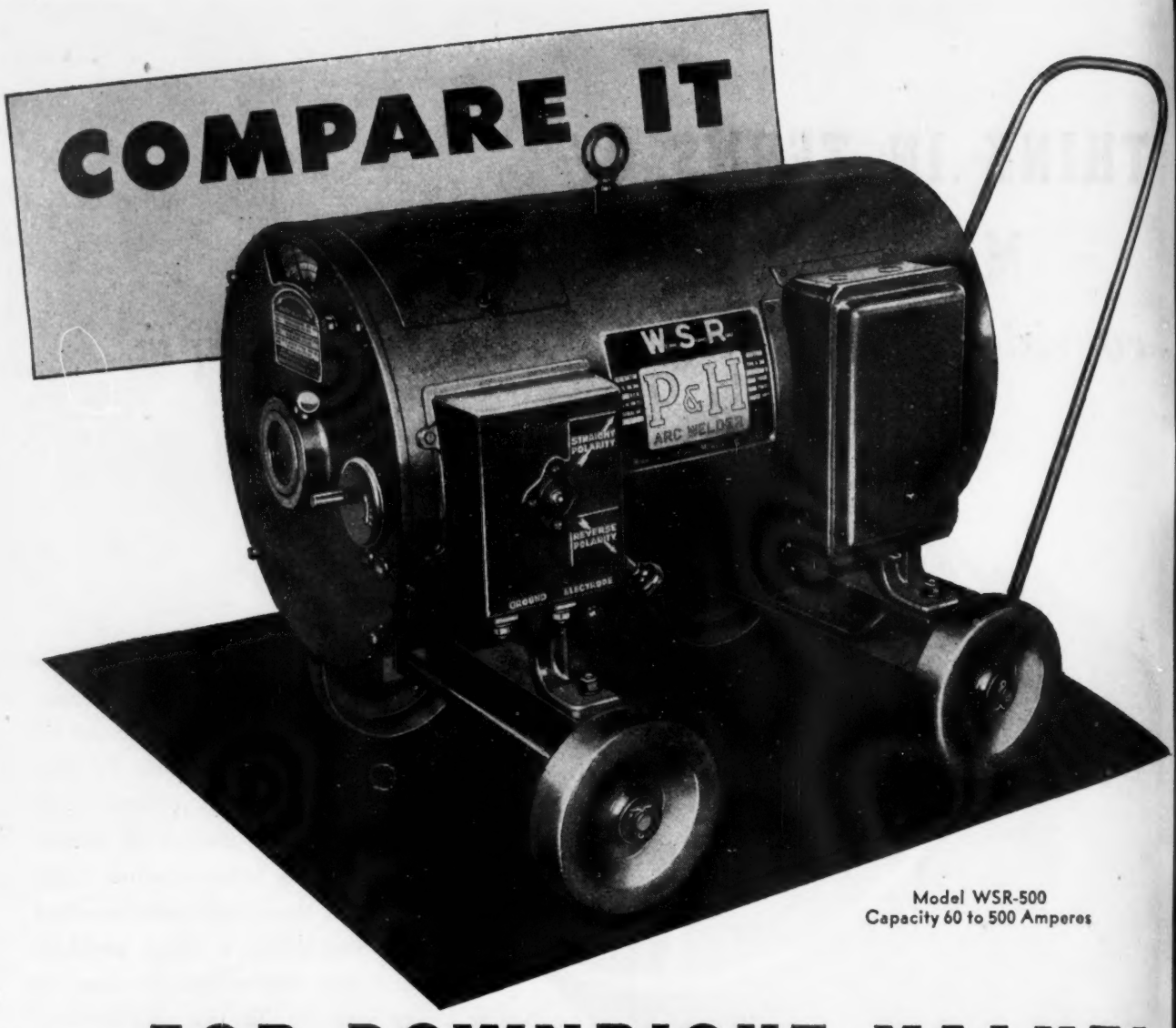

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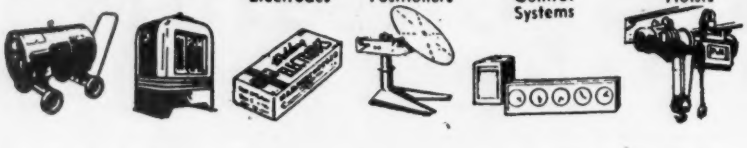

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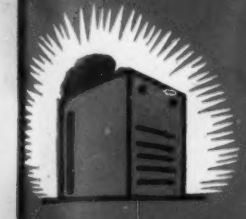
You can save man-hours because there is only one unit to buy, one unit to handle, one unit to install.



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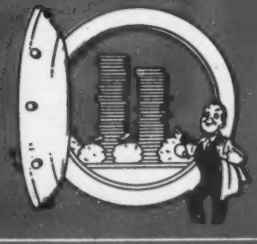

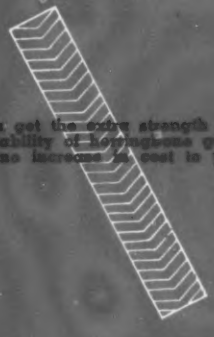

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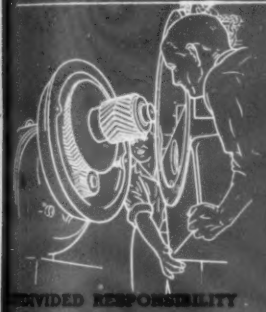

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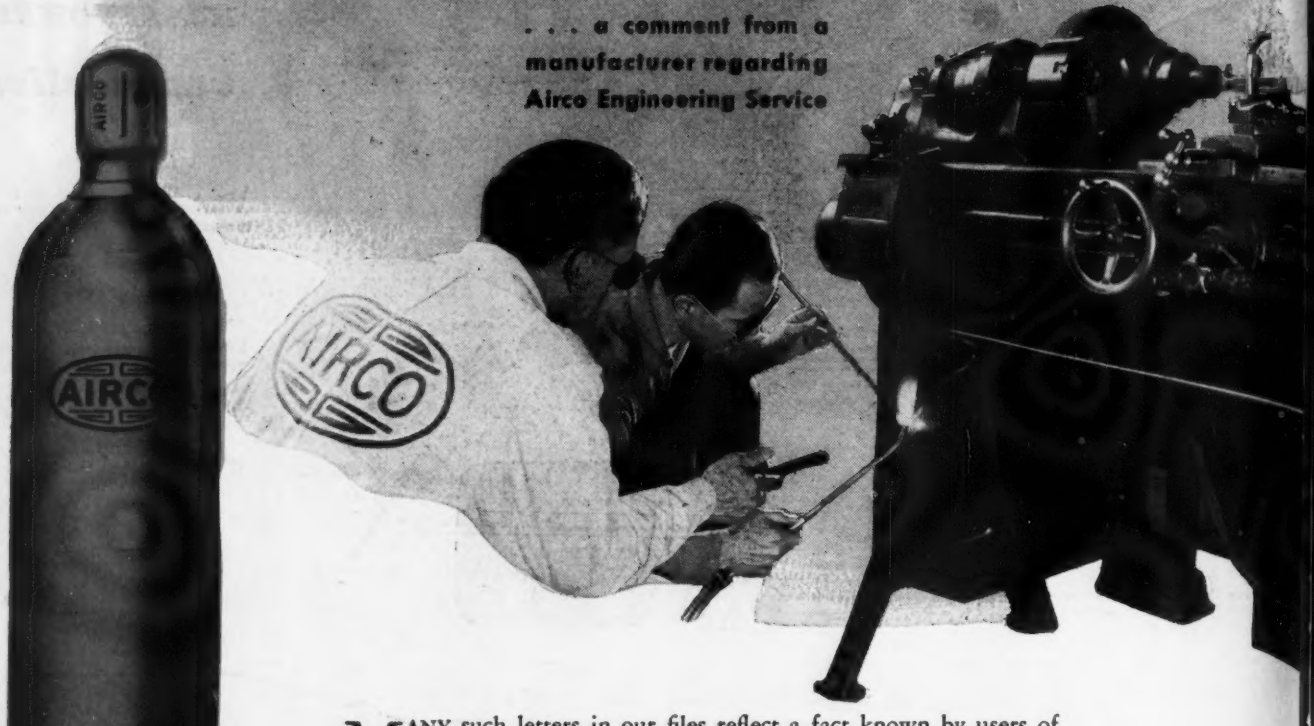
"Your helpful technical assistance saved us considerable expense and prevented a serious delay"

. . . a comment from a manufacturer regarding Airco Engineering Service



MANY such letters in our files reflect a fact known by users of Airco oxygen — individualized, technical aid is an extremely valuable part of Airco's *complete* oxygen service.

Experienced Airco engineering representatives are "on call" throughout the nation. Their job is to aid Airco customers make most effective use of Airco oxygen.

Write for an interesting free booklet "Oxygen — Indispensable Servant of Industry". Address Department S, at the New York office.

AIR REDUCTION AIRCO

General Offices: 60 E. 42nd St., NEW YORK 17, N. Y.
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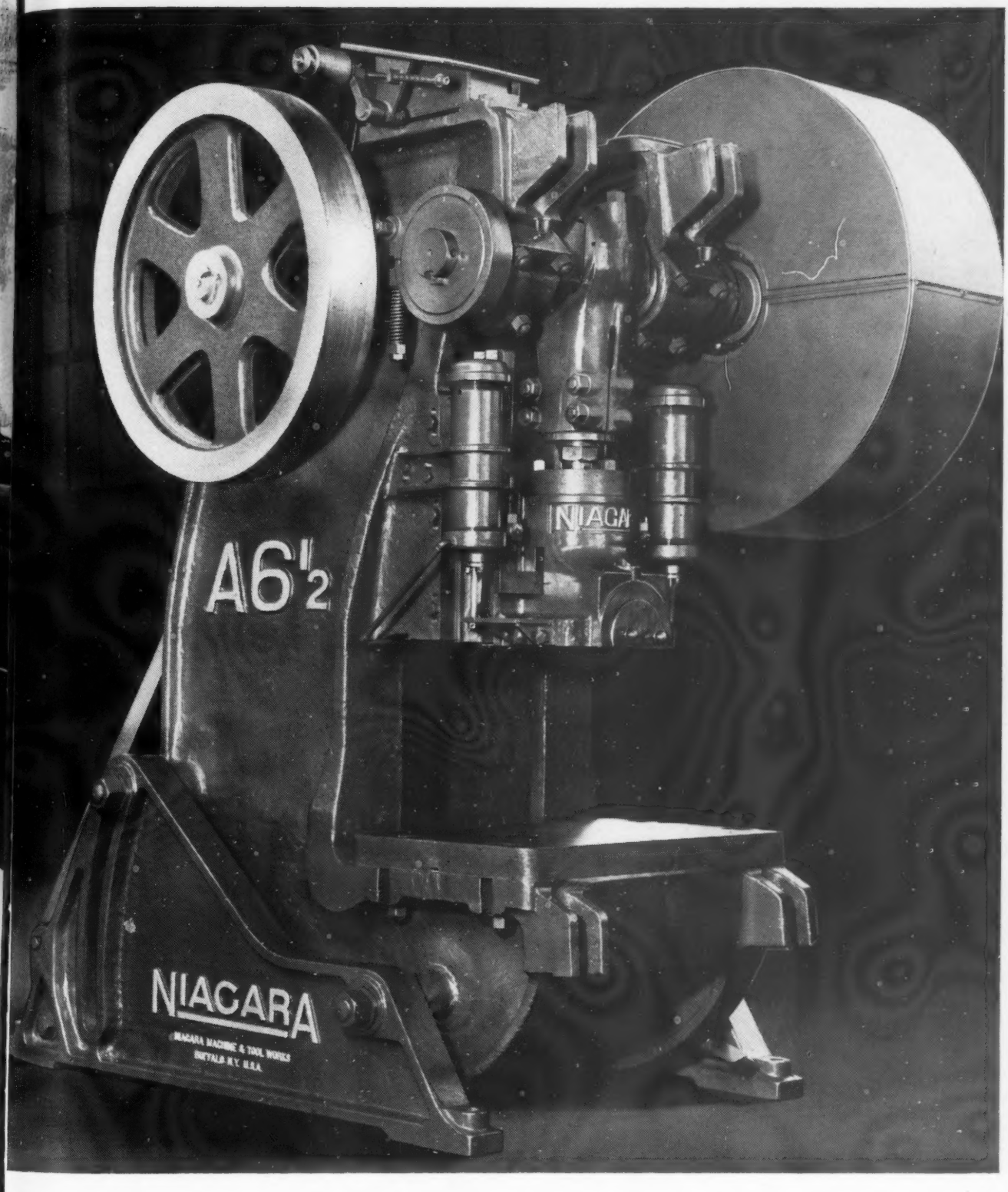
AIRCO OXYGEN GUARANTEED 99.5% PURE IN THE CYLINDER



SERVING WAR PLANTS

Niagara Presses and Shears are increasing output of fighting material. Just one example of their many advanced engineering features is the instant-acting Niagara 14-point engagement sleeve clutch which increases both the efficiency of the press and the operator, and results in more production per man-hour.

NIAGARA MACHINE & TOOL WORKS

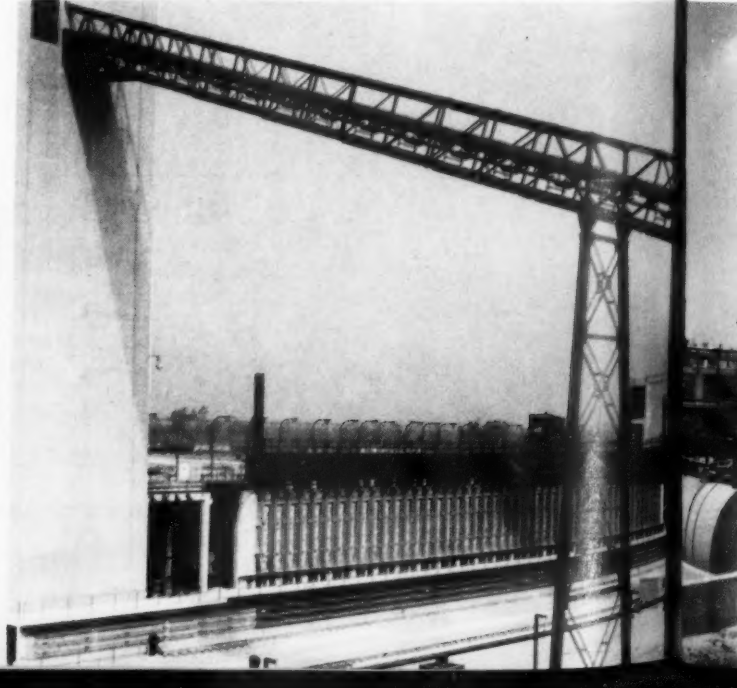
General Offices and Works: 637-697 Northland Avenue, Buffalo 11, N. Y., U. S. A.

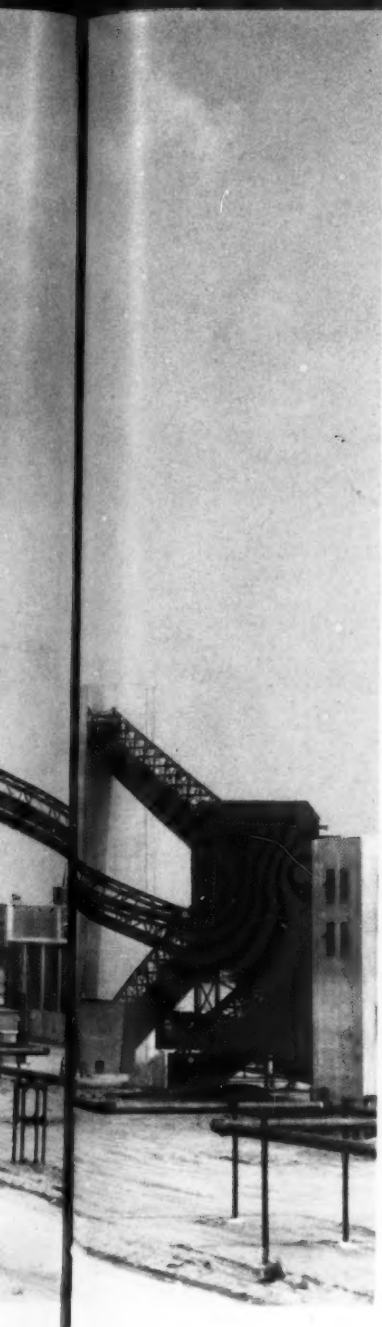
District Offices: General Motors Bldg., Detroit; Leader Bldg., Cleveland; 50 Church St., New York

General view of the plant

The byproduct plant

The pusher side of the coke-oven battery





This

Koppers coke-oven plant

helped meet

a serious problem

A steel mill, built at tidewater in the southwest, to produce steel for the oil fields, was designed to operate almost wholly on scrap from those oil fields. The rapid depletion of the scrap reserves during the war presented a serious problem to the management.

This was overcome by the construction of blast furnace facilities and a coke-oven plant. The coke ovens were built by Koppers and this company also designed and built a small but complete plant for the recovery and refining of other products from the coal carbonization process. The photographs on these pages illustrate the equipment designed and built by Koppers.

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY

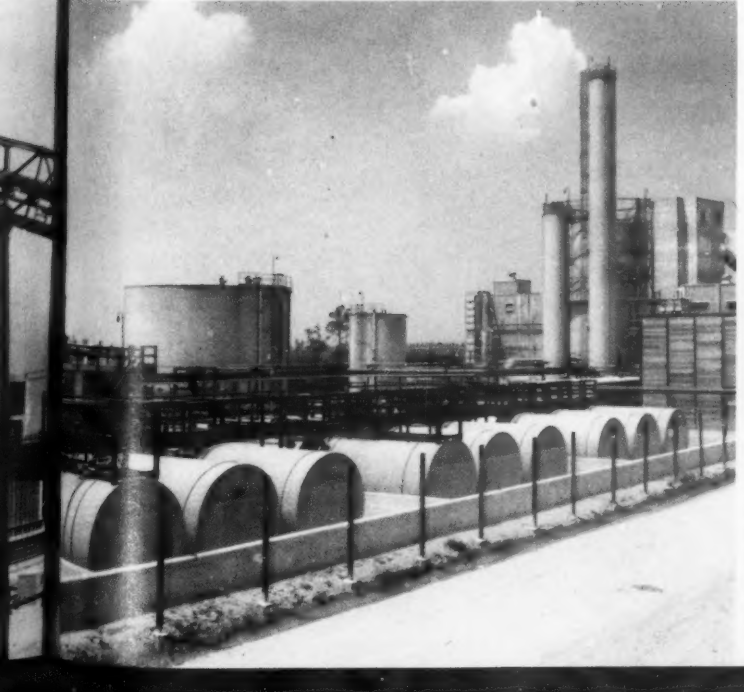
KOPPERS COMPANY, INC.

ENGINEERING AND CONSTRUCTION DIVISION

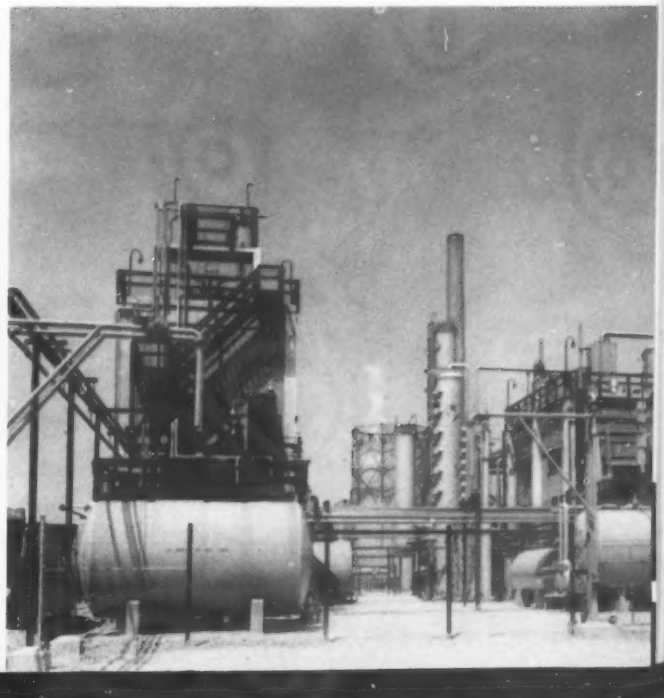
Pittsburgh 19, Pa.

Buy War Bonds . . . and keep them

Tanks for refined light-oil products



The light-oil refining plant



Complete PUMPING UNITS

. . . built, guaranteed, and serviced by ONE manufacturer

Pump illustrated is single-stage, split-case centrifugal.

Fairbanks-Morse complete pumping units offer you much more than sustained high efficiency. There are in addition these three vitally important advantages:

1. ***Combined Responsibility.*** Designed and built in one factory, pump and driver (motor or engine) are perfectly matched and covered by a single guarantee.
2. ***Successful UNIT Performance.*** Tested in one plant under expert engineering supervision, pumps and drivers assure a superior result to the buyer.
3. ***Service from One Source.*** No questions about who is to make any required repairs or adjustments.

You can get these major advantages from Fairbanks-Morse . . . because Fairbanks-Morse designs and builds all components of an outstanding line of complete pumping units. To see a qualified engineer about any pumping job, write Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.

BUY WAR BONDS FOR KEEPS

Fairbanks-Morse

A name worth remembering

Diesel Locomotives • Diesel Engines • Generators • Motors • Pumps • Scales
Magnetos • Stokers • Railroad Motor Cars and Standpipes • Farm Equipment

Why These Mean The Same

1 · Ryerson
2 · Steel from Stock

And How They Benefit Your Company Today

Though Ryerson steel-from-stock service to your company today can't always be as complete and fast as we'd like it, nevertheless, certain features of our service are probably more helpful than ever before.

If, for example, some particular item your company needs is not available—though our stocks in eleven plants are more diversified than any in the country—then we do our level best to recommend an item that will serve. And the recommendation is practical—made by men with extensive theoretical as well as practical technical experience with steel.

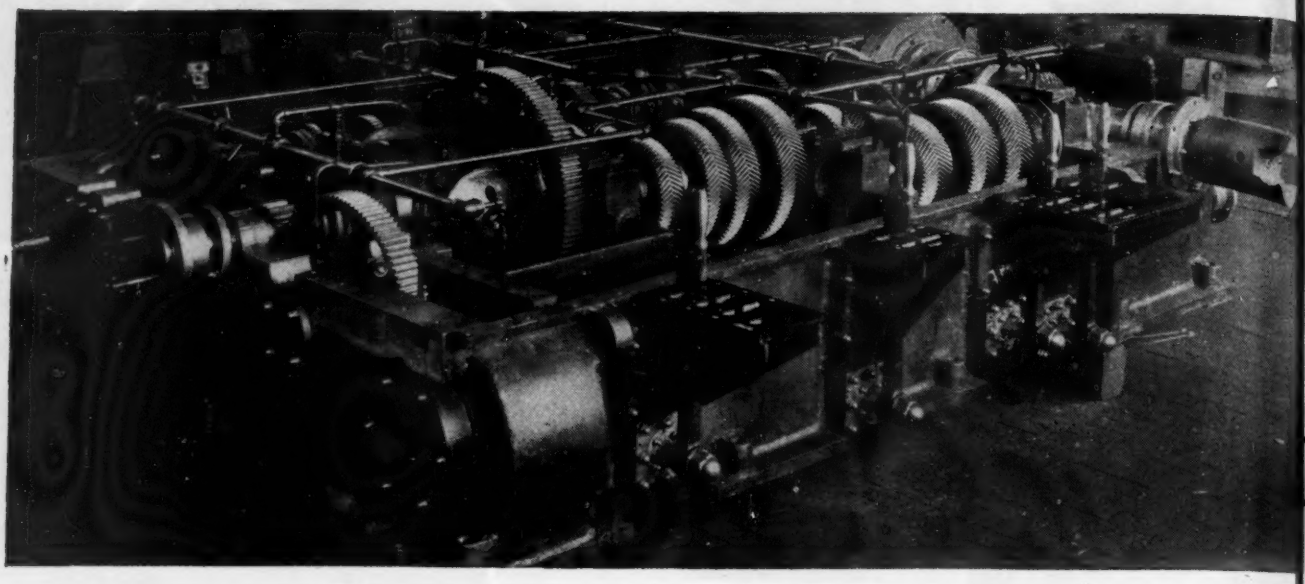
In most cases we can still deliver the steel you want, when you want it and where you want it.

Thus your purchasing executives can concentrate their steel-buying with Ryerson and know that Ryerson dependability is the same as always. That all your Ryerson contacts will be sincerely interested in helping with your steel problems. That all we have learned from more than 100 years in the steel business is at your service. If your company hasn't our latest Stock List and Data Book, will you please write our nearest plant.

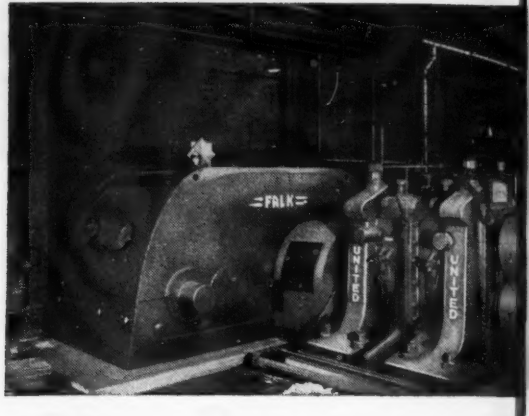
RYERSON CERTIFIED STEELS

JOSEPH T. RYERSON & SON, INC., Steel-Service Plants: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston.

RYERSON STEEL



"SHEAR" NECESSITY



REDUCTION gears transmit tremendous power to flying shears. Enormous pressures are exerted on gear teeth and bearings. To protect them, effective lubrication is a "shear" necessity.

In mills everywhere, experience has proved that *Texaco Meropa Lubricants* have all the qualities needed to stand up under today's high speeds and pressures. Their use prolongs bearing life and reduces wear.

Texaco Meropa Lubricants provide maximum load-carrying capacity, greater resistance to oxidation or thickening. They absorb shock loads in the heaviest steel mill drives and retain their EP characteristics.

Texaco lubricants have proved so effective in service they are definitely preferred in many fields, a few of which are listed at the right.

Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★ *More Diesel horsepower on streamlined trains in the U.S. is lubricated with Texaco than with all other brands combined.*

★ *More locomotives and railroad cars in the U.S. are lubricated with Texaco than with any other brand.*

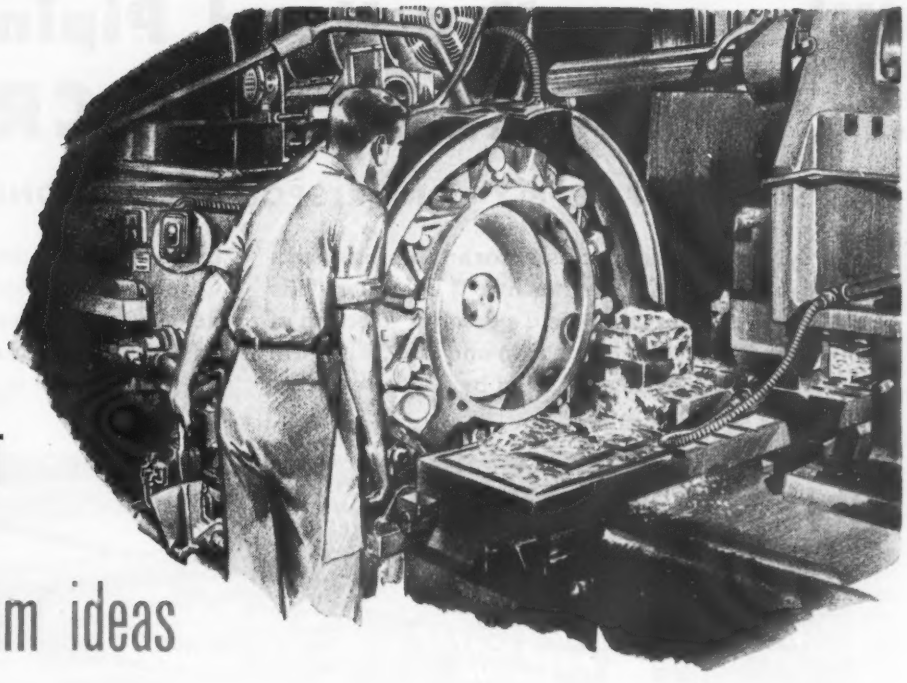
★ *More revenue airline miles in the U.S. are flown with Texaco than with any other brand.*

★ *More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.*

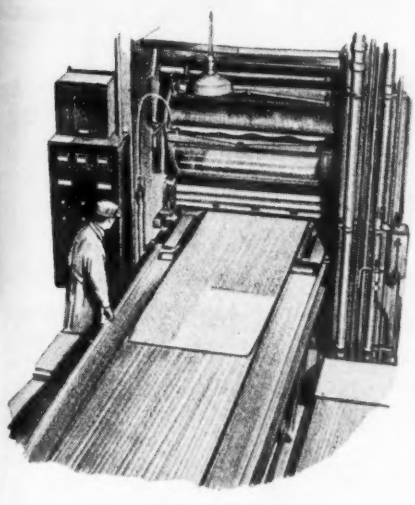
★ *More stationary Diesel horsepower in the U.S. is lubricated with Texaco than with any other brand.*

TEXACO **TEXACO Meropa Lubricants**
FOR STEEL MILL REDUCTION GEARS

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON EVERY SUNDAY NIGHT—CBS



Dow matches your new magnesium ideas with unequaled engineering experience



It's only natural that more and more progressive manufacturers think at once in terms of magnesium whenever exceptional lightness becomes a product factor. Based on magnesium's unique achievements in saving weight, power, cost, such thinking is responsible for a steadily increasing output of new magnesium product ideas.

Converting those ideas into practical applications takes *specialized* engineering knowledge and skill in addition, perhaps, to your own . . . the kind of technical ability that Dow has gained in 29 years of producing, alloying, and fabricating magnesium.

With a trained staff of metallurgical consultants at your disposal, Dow stands ready now to share this wealth of knowledge with you. Whatever your new magnesium ideas may be, experienced hands are waiting to take hold of your problems. Simply contact the nearest Dow office.

MAGNESIUM

THE METAL OF MOTION

MAGNESIUM DIVISION, THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

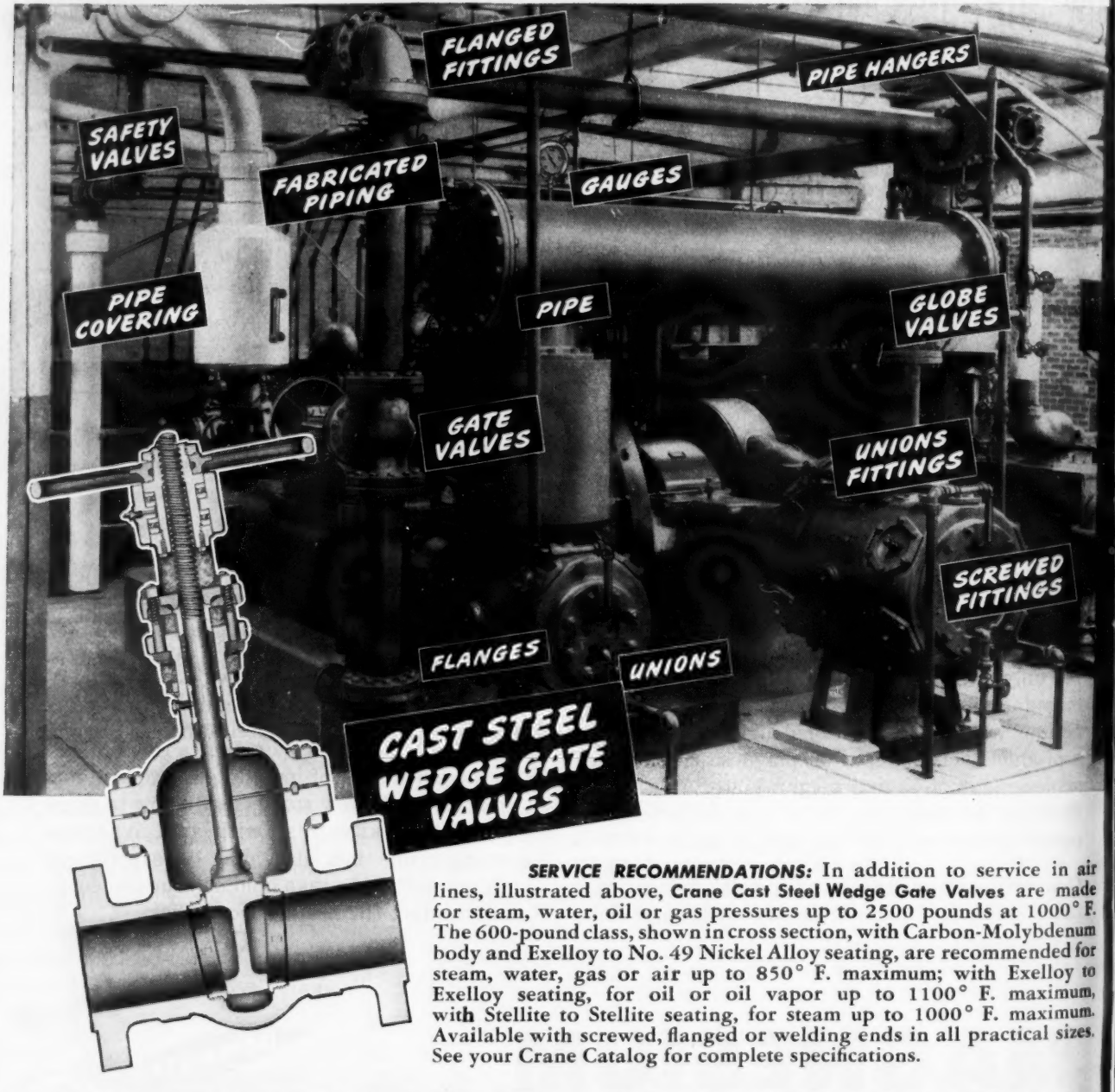
New York • Boston • Philadelphia • Washington • Cleveland • Detroit • St. Louis • Chicago • Houston • San Francisco • Los Angeles • Seattle

Wherever You Need Piping Material
...RELY ON CRANE

ONE SOURCE OF SUPPLY • ONE RESPONSIBILITY • ONE STANDARD OF QUALITY

Supplying everything necessary for any piping system is the job of your Crane Branch or Wholesaler. This single source offers the world's greatest selection of piping materials—in brass, iron and steel. Uniform quality in all materials—backed by single responsibility—helps assure the best installation. By using Crane *complete* piping materials service, you speed deferred replacements—keep piping performance at its best. Below is an example of the completeness of the Crane line—in Cast Steel Wedge Gate Valves.

Steam-Driven Air Compressor



SERVICE RECOMMENDATIONS: In addition to service in air lines, illustrated above, **Crane Cast Steel Wedge Gate Valves** are made for steam, water, oil or gas pressures up to 2500 pounds at 1000° F. The 600-pound class, shown in cross section, with Carbon-Molybdenum body and Exelloy to No. 49 Nickel Alloy seating, are recommended for steam, water, gas or air up to 850° F. maximum; with Exelloy to Exelloy seating, for oil or oil vapor up to 1100° F. maximum, with Stellite to Stellite seating, for steam up to 1000° F. maximum. Available with screwed, flanged or welding ends in all practical sizes. See your Crane Catalog for complete specifications.

CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. • *Branches and Wholesalers Serving All Industrial Areas*

CRANE

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

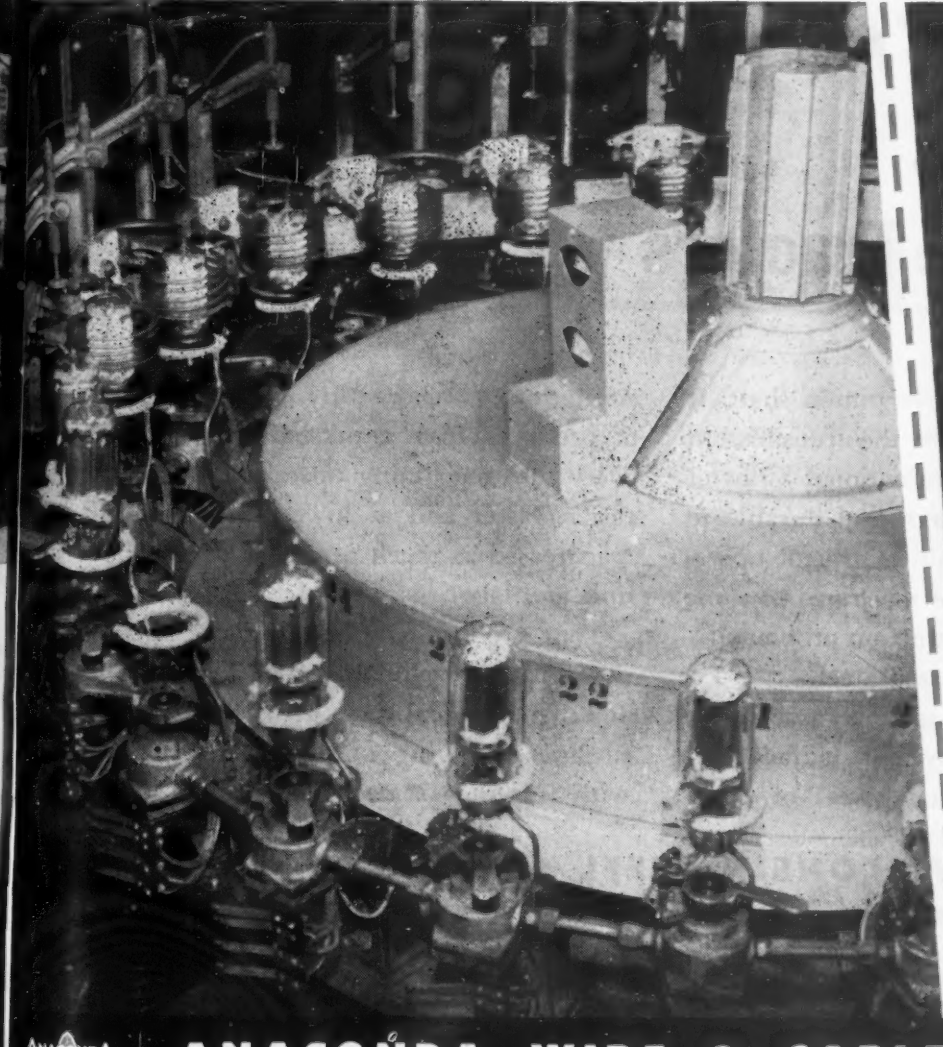
DON'T BE PENNY-WISE AND POWER-FOOLISH

You'll want all the production capacity possible from new, improved electrical equipment. Then don't let inadequate wiring rob you of equipment performance you pay for. Assure sufficient current for efficient operation of future electrical apparatus.

Remember, wiring won't stretch. Check up on your wiring plans *now!* It's far wiser to change blueprints than risk costly alterations later. This is the time to call in consulting or plant power engineer—electrical contractor or power salesman. They'll advise *foresighted* wiring. Anaconda Wire & Cable Company, Subsidiary of Anaconda Copper Mining Company. General Offices: 25 Broadway, New York City 4. Chicago Office: 20 North Wacker Drive 6. Sales Offices in Principal Cities. 45411

Get the performance you pay for in modern equipment—

Wire ahead



You wouldn't accept equipment that performed only part way—then why let inadequate electrical wiring cut production efficiency?

HELP BRING VICTORY SOONER
. . . BUY MORE WAR BONDS

ANACONDA

ANACONDA WIRE & CABLE COMPANY

MACHINABLE METAL for Shafts that Drive Tractors

TAKE this sprocket drive pinion shaft. It transmits power from the transmission to the tracks of an International Crawler Tractor. It must be tough and durable to stand up under the strain of tractor operation and yet it must be machined to close tolerances. A tough production problem?

Not for Sulphite-Treated Steel.

Here is a metal that sacrifices nothing in strength and durability but is far more machinable than ordinary steel of equal strength. It is successfully used in all kinds of products, from crankshafts to shells. In every case machining operations are made easier, faster and at lower cost. Tool life is increased as much as 200%, saving both time and labor.

Your product may be one more application for this machinable steel. Let our sales and metallurgical staffs investigate the possibilities of solving your production problem with Sulphite-Treated Steel.

WISCONSIN STEEL COMPANY

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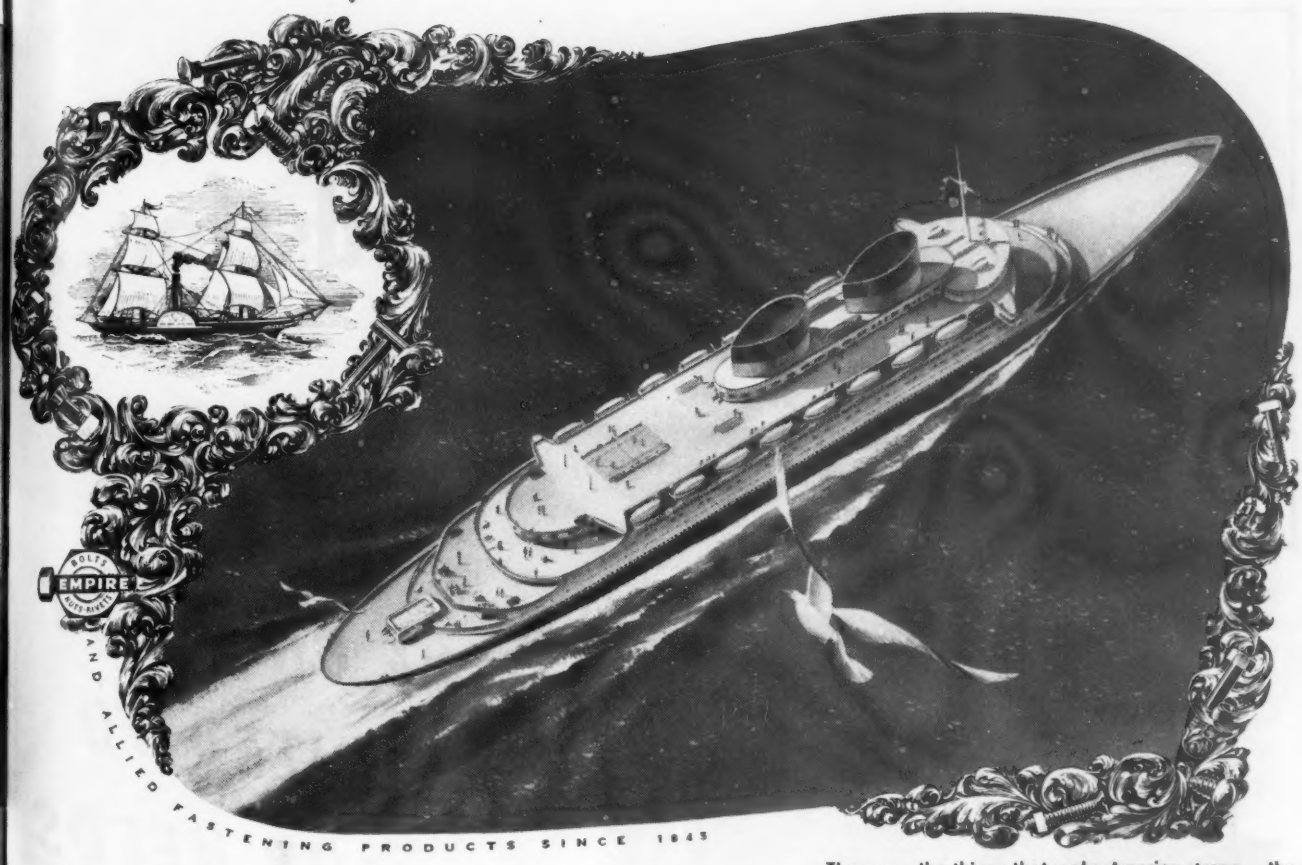
WISCONSIN SULPHITE-TREATED STEEL



These are the things that make America strong... the industries that RB&W has served during its 100 years of developing better fasteners for better products.

NO. 5 *Marine*

A *White Spread* OF CANVAS . . . A PATH OF CHURNING FOAM

SHIPS—for a hundred years—from the beautiful, fast Yankee Clippers and the early steamships to the modern "floating hotels" that in peacetime cross the Atlantic in less than five days, have had their "sea-legs" well fastened on with RB&W bolts and nuts. In this long use of RB&W bolts and nuts by the Marine Industry there is a special tribute to the ability of these products to withstand stress and shock—for what could test a fastener's character more than the constant pound and roll of the sea? . . . RB&W EMPIRE bolts and nuts have been serving on land and sea since 1845. Early in the company's history, it appropriated a sum of money for *research* and *development*—a policy which has been followed with ever-increasing effectiveness to this day. The founder of Russell, Burdsall & Ward invented the world's first automatic cold-header, and in the same tradition, other RB&W engineers have developed other new machines and processes which have helped continually to improve RB&W products in strength, accuracy, and finish . . . Today's RB&W bolts and nuts offer —and so will tomorrow's—the maximum in all the qualities that you ask for in a fastener. From raw material to finished product, they are made by the finest methods, machines and craftsmen, and backed by 100 years of "know-how" in quality bolt and nut making. Make RB&W *your* headquarters for fasteners.

100 Years.. MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

RB&W

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Factories at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. *Sales offices at:* Philadelphia, Detroit, Chicago, Chattanooga, Los Angeles, Portland, Seattle. *Distributors* from coast to coast. The industry's most complete, easiest-to-use catalog.

3 tested methods for...

CHOOSE THE ONE BEST SUITED TO YOUR NEEDS

Accurate control of electrode position—that's the key to efficient arc furnace operation—and *that's fundamental.* To obtain this, it is necessary to control the electrode position by the relation between arc current and arc voltage—and that's fundamental, too. This is a Westinghouse development, proved by more than 20 years' use.

Westinghouse has 3 tested-in-use types of electrode control—all operating on this basic principle. *No other manufacturer can offer you this wide a choice.* For complete *unbiased* advice on which type is best suited to your needs, call your nearest Westinghouse representative. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

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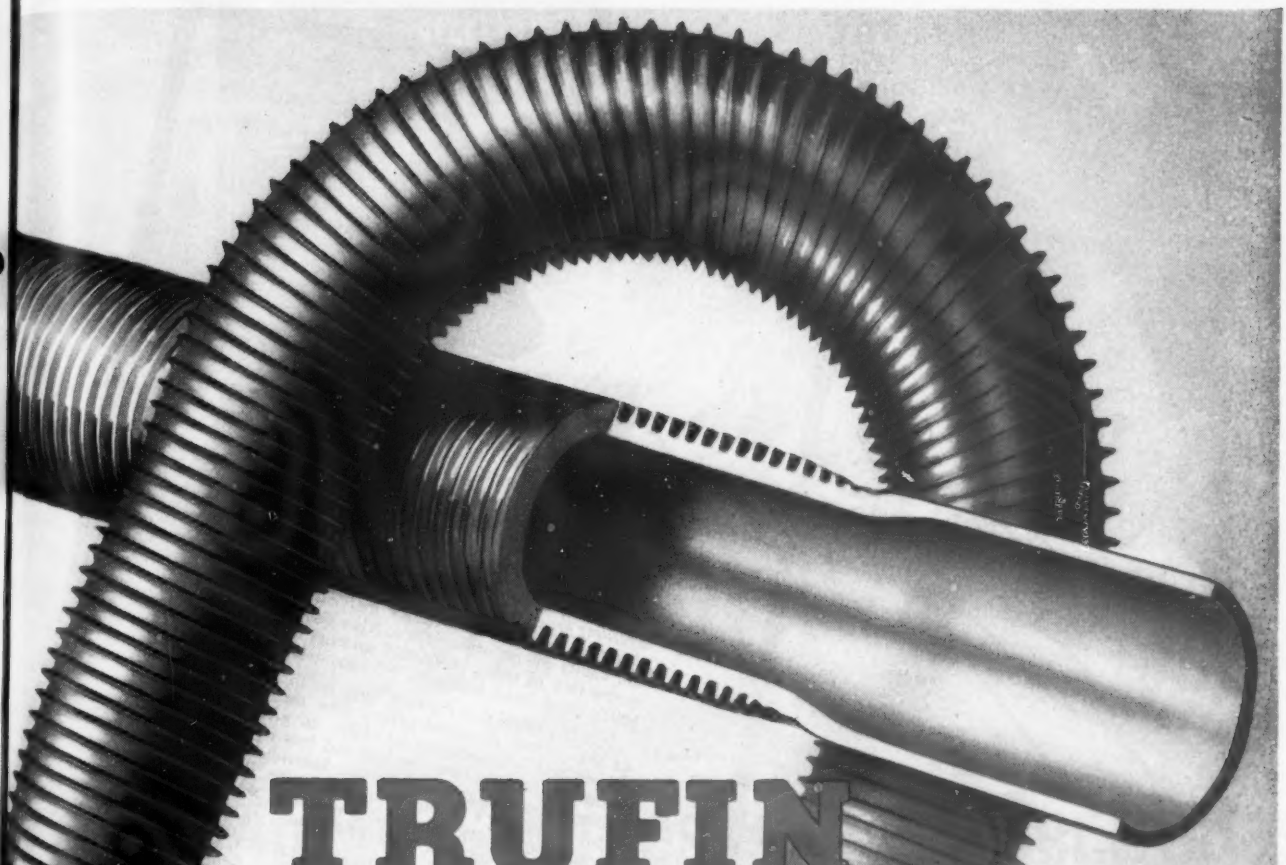
Westinghouse

PLANTS IN 25 CITIES... OFFICES EVERYWHERE



TRUFIN
WILL BE SPECIFIED

—if you demand non-ferrous finned tubing for condensers or heat exchangers with sturdiness to withstand severe vibration or extreme heat changes.

You'll want TRUFIN because of its unique construction—all one piece. With the fins and tube integral, this finned tube delivers a service of outstanding merit—with economy and dependability.

TRUFIN is available in root diameters, from ⅜" to 1", and with fins of varying heights and spacings. It can be bent, formed, and handled much like plain tubing.

Send for a copy of "Report on TRUFIN" which gives much technical information about the use of finned tube.

WOLVERINE
TUBE DIVISION
CALUMET & HECLA CONSOLIDATED COPPER COMPANY
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BUY
WAR BONDS

In Canada: UNIFIN TUBE CO., LONDON, ONT.

OCTOBER 2, 1941

WE RENEW OUR PLEDGE

Two years ago, at the beginning of the present war with its uncertainties and threats to the future of all industry, this Company publicly pledged itself not to increase its selling prices.

On this, the second anniversary, we again publicly renew that pledge.

During the last two years we have not only kept the pledge previously made, but *we have actually reduced our selling prices by more than* 6% because of more efficient operation made possible by the marvelous cooperation and ability of our organization. This was accomplished in the face of rising labor and material costs, both of which have been increased by considerable amounts.

It is our belief that the only hope for the continuance of the present industrial system now threatened from within and without is in its ability to give more and more to the consumer for less and less of his dollar. This is the strength of American individual initiative. This is the hope of our country's future. If American industry can accomplish this universally, we need not fear dictators either at home or abroad.

THE LINCOLN ELECTRIC COMPANY

Cleveland, Ohio
October 2, 1941

J. F. Lincoln
President

STATEMENT OF POLICY

The world is entering a crisis, the result of which no one can foresee. Other wars have brought inflation, followed by unemployment and depression after peace was achieved. America's experience in the World War illustrates this fact.

Much of this post-war trouble would have been eliminated by a more foresighted price policy on the part of manufacturers and distributors. Price inflation by the seller when he had a dominant position resulted inevitably in reaction with deflation, depression and suffering. Many of those price increases were not warranted.

Before such an inflationary cycle of prices is again started, we publicly pledge ourselves, as far as possible, to maintain present prices.

Further, if the materials we buy are increased in price, or the cost of labor is increased, then we pledge ourselves to raise selling prices no more than the bare increase in cost of raw materials and labor going into our products.

Further, we pledge ourselves to pass on to our customers the reduction in cost made possible by better manufacturing methods, wider distribution and technical advances in production.

THE LINCOLN ELECTRIC COMPANY

Cleveland, Ohio
October 2, 1939

J. F. Lincoln
President

OCTOBER 2, 1939

How Murex Stainless Steel Electrodes Stopped a Front-Office Feud

I saw we were in for a grim front-office hammer fight, complete with bashed-in tin crowns and spattered executive blood. For weeks Old Flagg, our Purchasing Agent, had been going over our purchase orders, trying to trip up Charley Pratt, his assistant and my boss. Old Flagg's not mean, really: it's just his idea of efficiency. Only now it had stopped being tiresome and become maddening, especially as he at last had Charley out on a limb.

"Murex does so make A.C. Stainless Steel electrodes!" Charley practically yelled, right in the old mule's face. "Isn't Murex one of the leading manufacturers of arc-welding rods? Haven't we bought their stuff for years? Of course they make Stainless Steel electrodes for use on A.C. and D.C. both! And darned good ones, I assume."

"See?" Old Flagg barked, triumphantly. "You don't know if they make them or not: you assume. Now when I was a young man, just starting up the ladder of success..."

I'm only a secretary, but that's where I stepped in. I've heard, nine million times, the tale of Old Flagg's thrilling Rise To The Top. Besides, if the feud went much further, I'd have the bother of breaking in a new boss.

I therefore said sweetly, "Gentlemen, I do not mean to rush in where even Joe Louis would fear to tread. But why don't we walk across to the shop and ask Tom Belt, the arc-welding super?"

We walked across and asked Tom. He didn't like to say too much, Old Flagg being present. Instead, he just pointed at the new Murex Wall Chart tacked up over his desk. It listed Murex's thirty-odd electrodes, divided by class: for mild steel, low-alloy steel, hard surfacing—and Stainless Steel both A.C. and D.C.*

I thought Old Flagg would hum and haw, and keep beating on Charley on general principles. Instead, as a peace offering, he treated Charley and me to a swell lunch up in the very plush senior executive dining room. You may not get a free lunch out of it, or stop any front-office wars, but if you have anything to do with arc-welding, you should have a copy of the big Murex Wall Chart handy. A postcard will bring you one.

***The Murex Stainless Steel electrodes the above excitement's about are 18/8, 18/8Cb, 18/8 Mo, Type 347, 19/9 Mn, 25/20 and Type 310. 18/8 Mo, Type 347 and Type 310 operate either on A.C. or DC., and the others on D.C.**

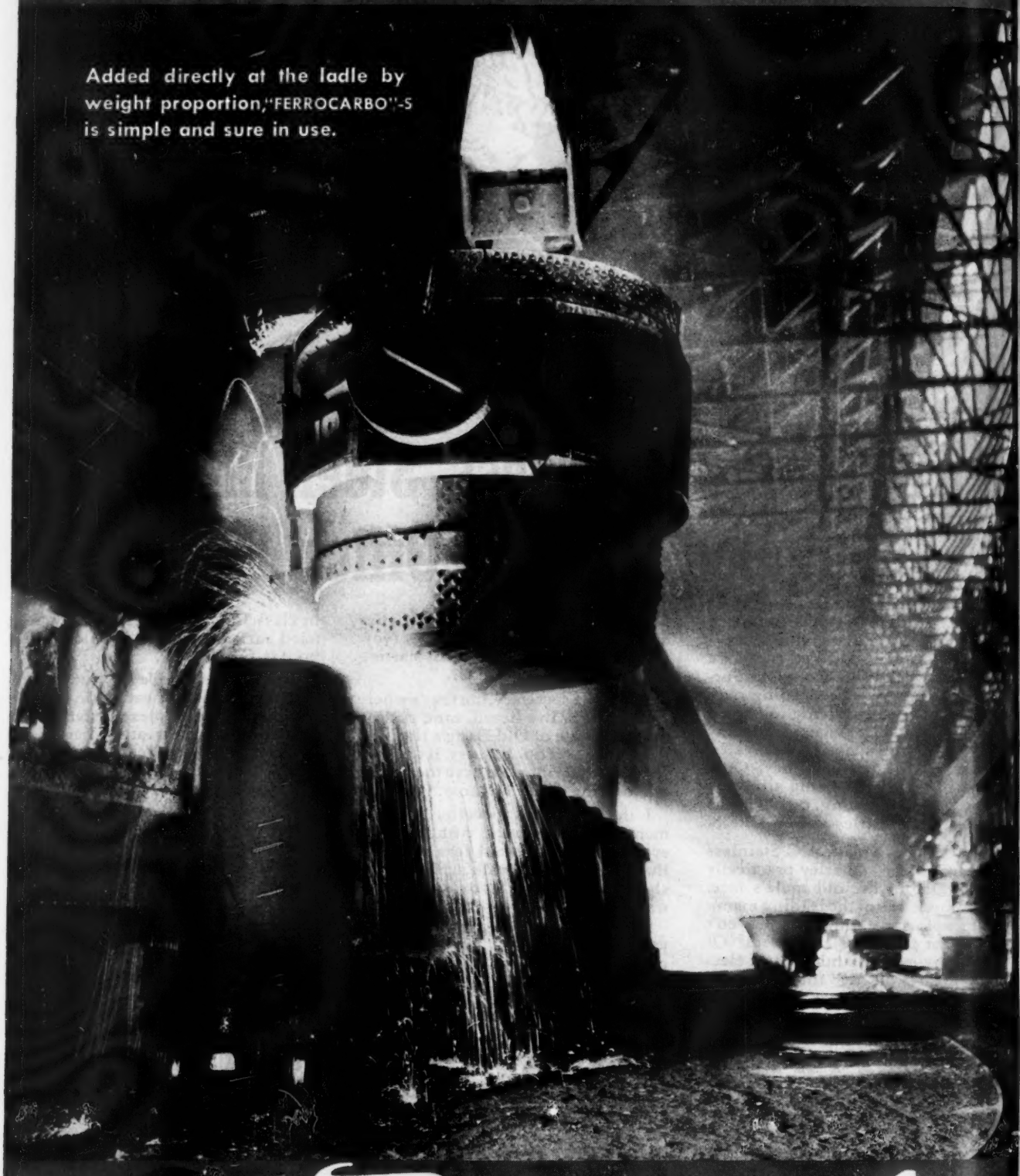
METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK 5, N. Y.

ALBANY • CHICAGO • PITTSBURGH • SO. SAN FRANCISCO • TORONTO

MUREX *Electrodes*

"FERROCARBO"-S



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REDFORD

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AIR VALVES!

ELECTRICALLY OR MANUALLY OPERATED

THE REDFORD ENGINEERING CO. presents these NEW, HIGH QUALITY AIR-VALVES to discriminating manufacturers. Expertly designed and manufactured to suit your most exacting needs. These valves are produced in 36 models in the following sizes:

¼"—⅜"—½"—¾"—1"—1¼"

Write or phone us today for further information.

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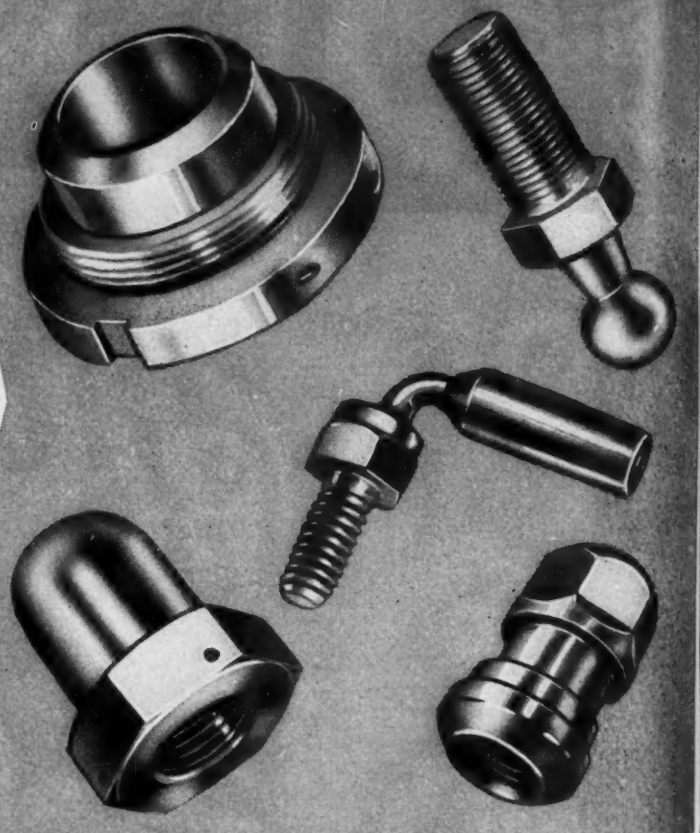
Redford ENGINEERING CO.

21200 W. 8 MILE ROAD

DETROIT 19, MICHIGAN

Need Parts Like These?



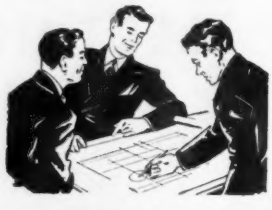
Come to Tourek

These are typical precision screw machine products. Tourek can make them *exactly to your specifications* . . . in any size from 1/16" to 2 5/8". . . in any metal . . . in any quantity.

Here at Tourek to supply these custom products is an organization coordinated to serve. An organization complete and modern in *equipment* . . . ingenious in *engineering "know-how"*. . . and rich in manufacturing *experience.*

Although present production demands are today engaging our facilities, we are eager to serve you. Why not consult us—particularly on your postwar screw machine products problems?

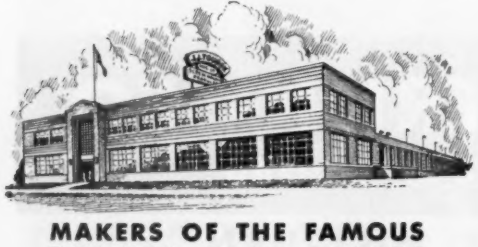
TOUREK'S EQUIPMENT
Tourek's modern plant is equipped with the latest model automatic screw machines, all necessary supplementary equipment and complete tool room facilities.



TOUREK'S INGENUITY
Tourek's Engineering Staff works closely with you to devise the most effective design and economical production of precision parts.

TOUREK'S EXPERIENCE
To the solution of your special problems Tourek brings to bear nearly a quarter of a century of successful, volume manufacture of screw machine parts of the most intricate design and precise dimensions.

J. J. TOUREK MFG. CO.
4701 W. 16th Street **Chicago 50, Illinois**



MAKERS OF THE FAMOUS TOUREK BALL JOINTS

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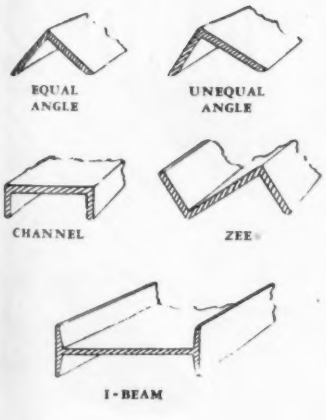

This Birdsboro machine as illustrated is designed for versatility and high output. It has eight motor-driven main rolls and two idler rolls. The main drive is provided with anti-friction bearings throughout. The vertical rollers have power-operated adjustment. In addition, the machine is equipped with the Birdsboro patented roll end adjustment which permits quicker and more accurate adjustments for varying shapes.* And for further convenience, it is provided with a motor-operated drive for shifting the machine out of line when not used.

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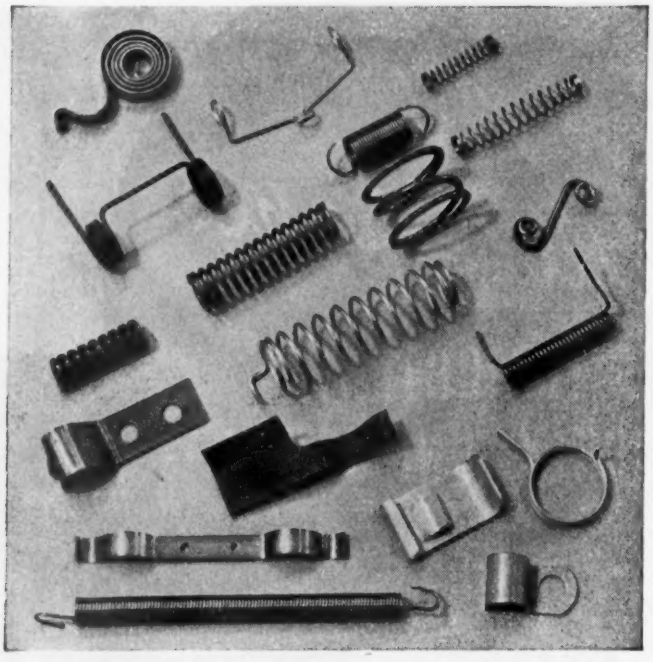

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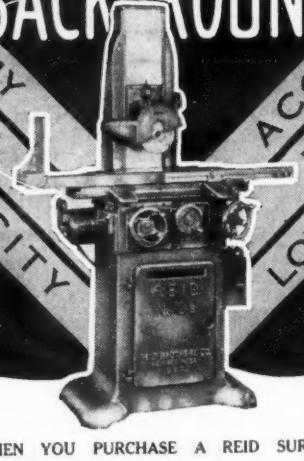

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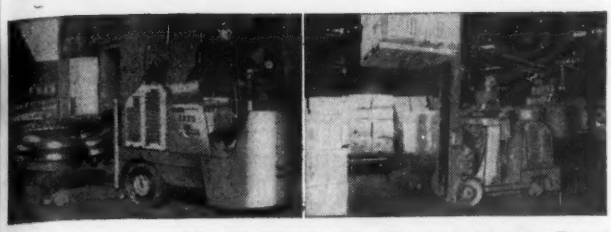

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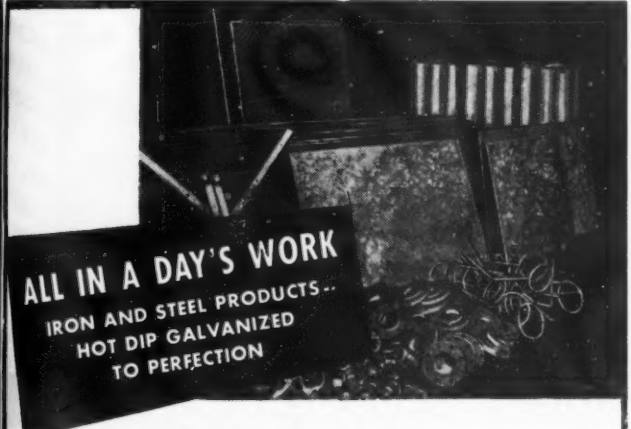

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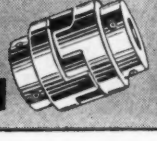

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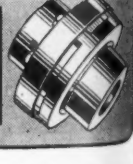

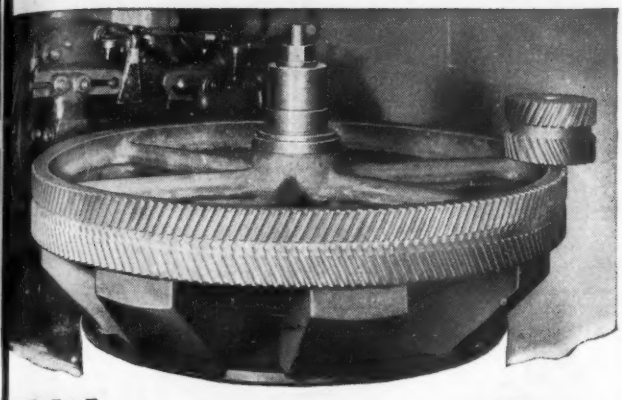

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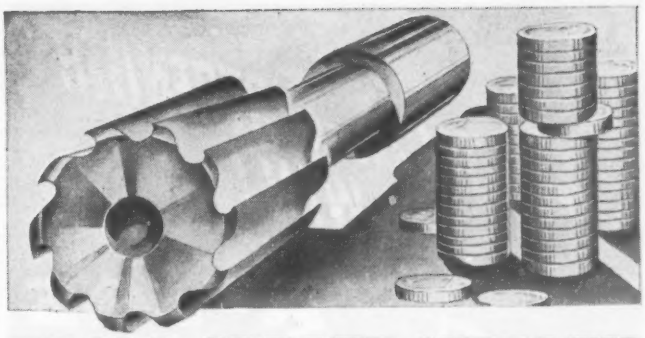

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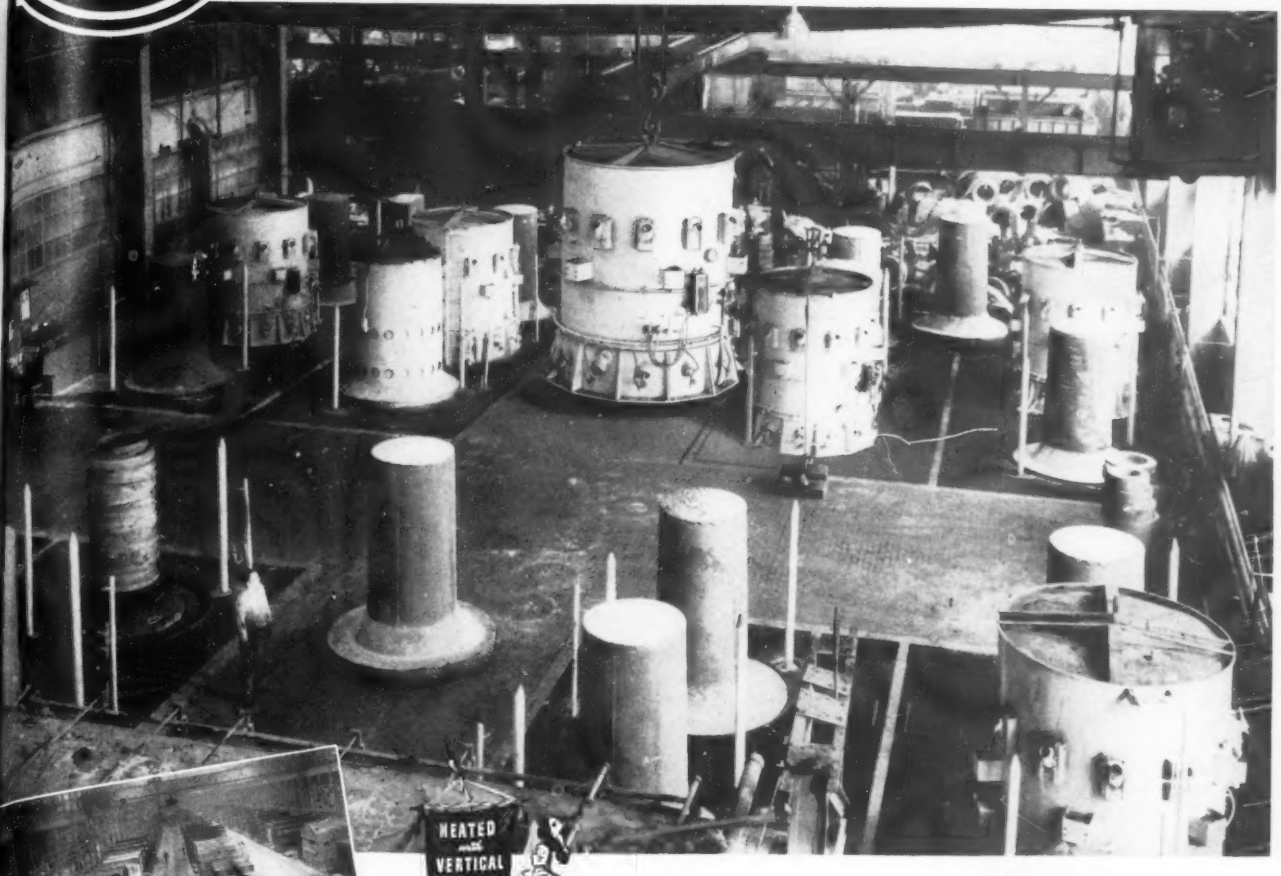

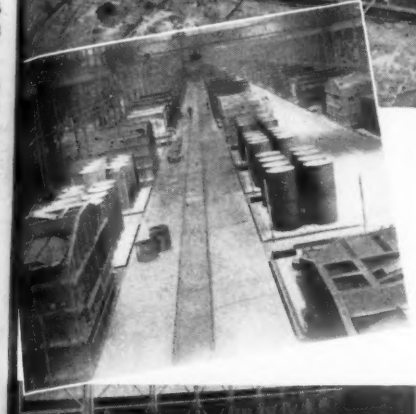

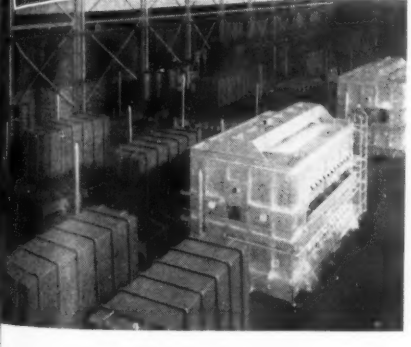

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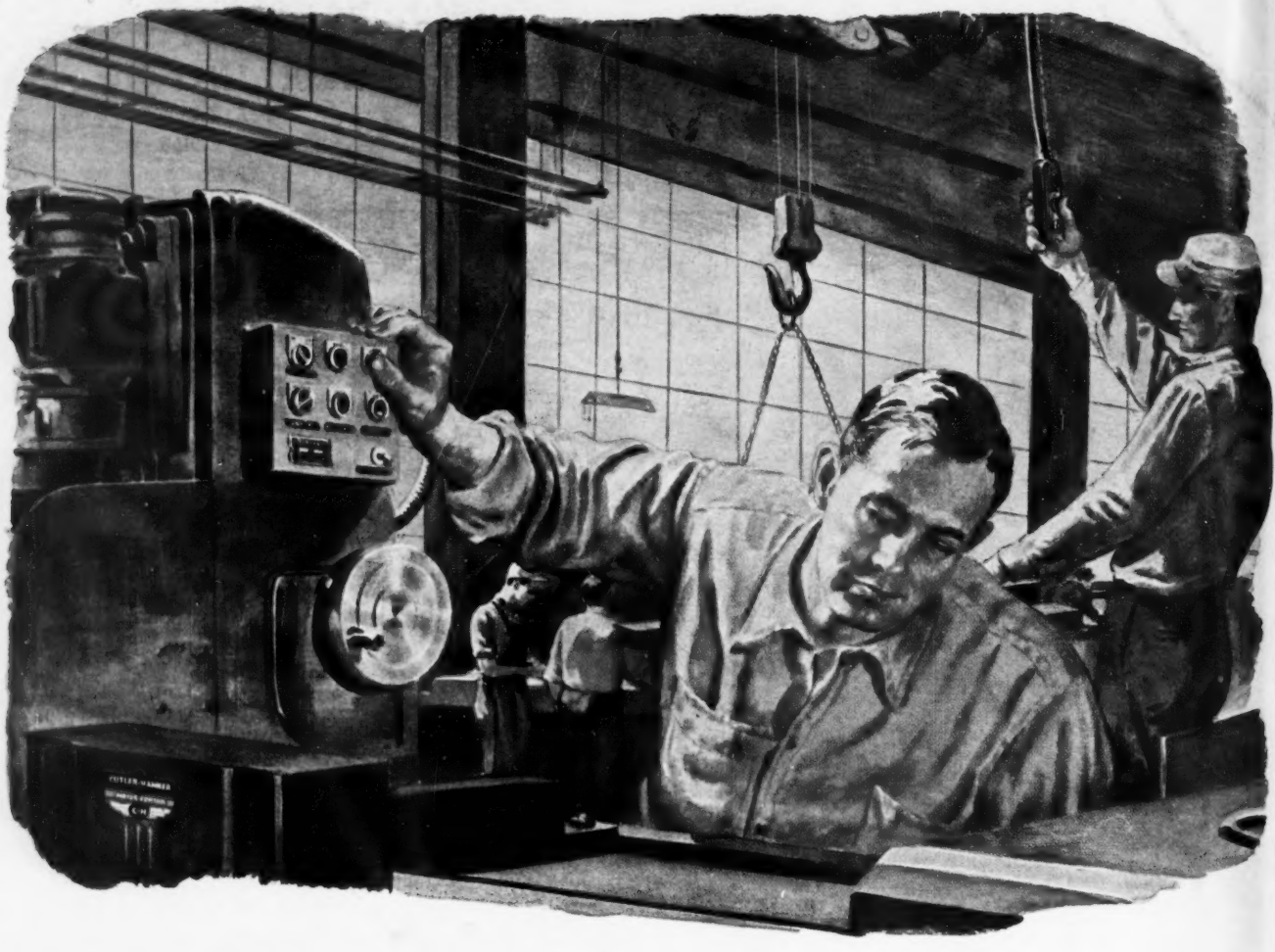

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